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OF THE

Rochdale Literary & Scientific Society.

VOL. III.

1891-1892.

Rochdale:
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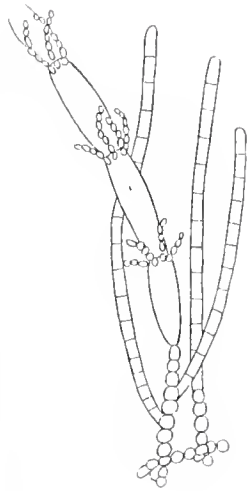

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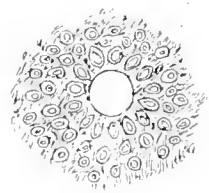

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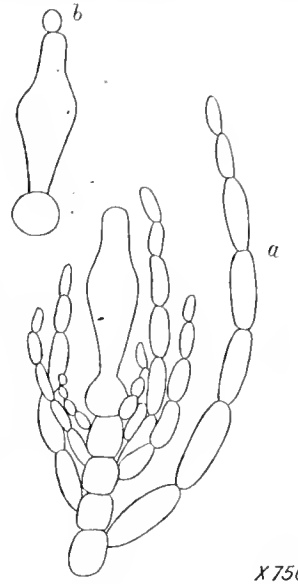

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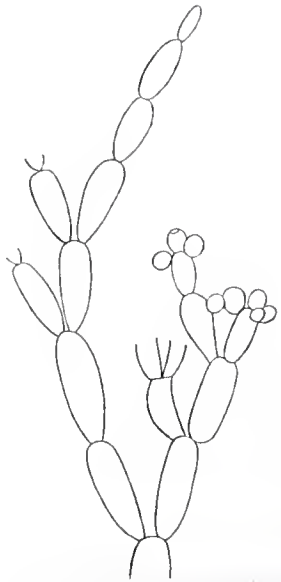

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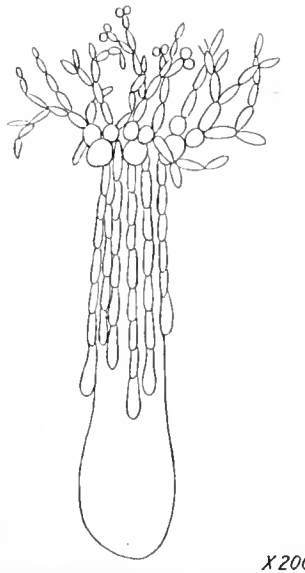

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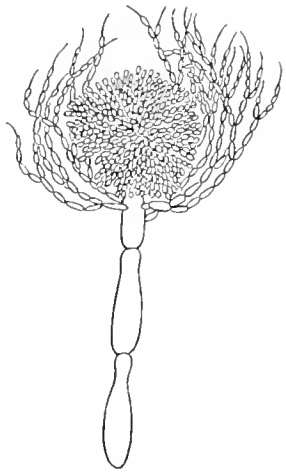

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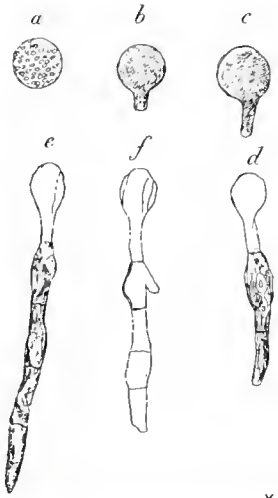

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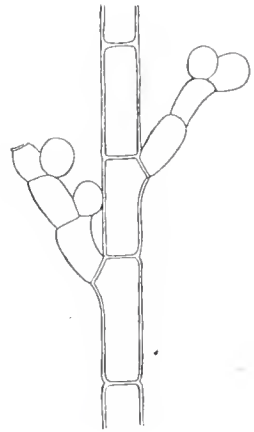

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Contents.

		PAGE.
Bead Moss	Mr. T. S. Smithson	1
Coal Smoke	Mr. T. Stenhouse, F.C.S., F.I.C.	13
Our Local Problem of Poverty	Rev. R. Veitch, M.A.	21
Rochdale Surnames	Lieut.-Col. Fishwick, F.S.A.	31
Some of the Recent Results of the Investigations into Local Erratic Blocks	Mr. S. S. Platt, Assoc. Mem. Inst. C.E.	52
The New Star in Auriga	The Ven. Archdeacon Wilson	57
Magic Knots	Dr. H. C. March	59
Seasonable Variations of Temperature at Spring Mill Reservoir	Mr. J. R. Ashworth	65
On Evolution in the Ornamental Art of Savage Peoples	Translated by Mrs. H. C. March	73
Proceedings		151
Excursions		162
Report for 1891		i. to x.
Report for 1892		xi. to xxi.

Illustrations, &c.

Diagrams of Bead Moss	*to face*	12
Map showing position of Local Erratic Blocks	*to face*	56
Thermometric Diagrams		65, 70, 71
Ornamental Art of Savage Peoples		133 to 150

BEAD MOSS.

By T. S. SMITHSON. Read 27th February, 1891.

THE genus of *Algæ* to which these rare plants belong may be considered now as the highest in the scale of development comprised in its class, and represented in British fresh waters. Plants of a still more complicated organisation are, it is true, included among the *Algæ* by some writers, but the majority of naturalists are in favour of placing the upper boundary of the group at this point for reasons which it would be useless for me to explain here. I will therefore pass on to the description of the plants themselves without occupying more time on the subject of their place in the classification of the vegetable kingdom.

The name *Batrachospermum* has been given to the genus on account of the fancied resemblance which some of the species are supposed to bear to frog-spawn, but I can hardly commend the choice of a word which, while it is, to say the least, not particularly euphonious, is not founded on any important quality of the plant. The general plan on which these plants are constructed is the same in all species. To the naked eye they appear to be composed of a somewhat slender branching main stem, on which grow bead-like tufts of filaments, whence the English name of bead-moss (Fig. 1). They usually grow on stones in the bed of gently-running streams, and are rather variable in size; the average length of the stems in the commonest British species may be taken at about three inches. The colour varies very considerably in different species, and even in the same species is by no means constant. I have found specimens of one kind which were pale yellowish green, others greyish green, and others again dark greenish purple. The only important character remaining which can be discovered without the help of a microscope is the presence of a covering of slimy jelly-like matter. This mucilage pervades the whole plant, and I shall presently have to allude to it again and explain its origin.

Taking now the more minute structure only discoverable under the microscope, I will begin with the main stem. When quite young it consists of a single row of large cylindrical cells, placed end to end so as to form a thread (Fig. 2). Properly speaking, this is the only part of the plant which can be considered as the stem, for the further development is not—as in the higher plants—the result of the division of the cells of the stem itself, but of the superposition of cells having an independent origin round the large cells I have just mentioned. Confining ourselves at present, however, to the structure of the young stems, we shall find a number of much smaller cells, generally six, are formed around it by a process of budding. These again give rise to other cells, and so on till a circle of little tufts of branched filament is formed at the top of each main cell, and the characteristic appearance of the full-grown plant begins to show itself. During this earlier stage in the growth of the tufts the cells in the main stem continue to grow thicker and larger. Soon, however, a new factor is introduced which greatly affects their development, and in order to explain its action we must turn our attention for a moment to the tufts,—and it will perhaps be best for me to describe their chief features now, as I shall have to speak of them in the adult form. They are, then, composed of very small oval, round, or cylindrical cells, the last being always narrowed at the point of contact, arranged, as I have already stated, in ramified filaments, six of which make up each bead. In Fig. 3, part of one of these filaments is shown roughly in order to give an idea of their general form, which does not differ materially in one species from another, except in the unimportant point of size. When the filament has reached its normal growth, or perhaps rather earlier, cells begin to bud out from some of the older ones on their under side: that is, on the side of the filament which is turned towards the root of the plant (Fig. 4). Now, these new cells are very different in both shape and size from those which compose the filaments of the tufts. Instead of being rounded at the ends they are regularly cylindrical, and their size is very much less, as a rule, than that of any of the cells except the youngest. The first to be produced always arise

from the cells next the main stem. As in the case of the ordinary filaments the cells multiply till a number of threads are formed, but there is no branching. That they have some office to perform in connection with the main stem is apparent from almost the beginning of their progress; for they do not extend themselves freely into the water, but lie closely pressed against its large cells. Thus, in a short time, a kind of skin is constructed out of these primarily independent threads. The effect on the cells of the main stem is rather curious. As soon as the upper part of these cells is surrounded by the threads, which I shall call in future the cortical filaments, their lateral expansion is stopped in the covered portion, while that of the lower part still continues. The result is that the shape of the cells of the main stem becomes altered from cylindrical to club-shaped. On reaching the tuft next below the one from which they had their origin the cortical filaments force their way through its branches, and continue to grow over the filaments which belong to the second tuft, thus adding a second layer of cortical tissue over the first. The production of cortical filaments is not confined to the first-formed cells of the tufts, but may be taken part in by all but those too far from the main stem to admit of the filaments reaching it; and even this limit is not invariably adhered to, though in the latter case the tufts in which it occurs are usually those very near to the base of the plant, and the outer series of cortical filaments is employed as an additional means of holding the plant in its place. It is also probable that the outer layer, whether it be attached or not, takes the principal part in the nutrition of the plant.

To say that the cortical filaments are unbranched is, though strictly true, nevertheless somewhat misleading, as it would suggest the idea that no cells are given off laterally from them. On the contrary, in some species the outer filaments give rise by budding to tufts, which can with difficulty be distinguished from those which grow from the main stem in the ordinary way. I will call them internodal filaments. The species vary considerably in the extent to which they are capable of producing internodal filaments. In some kinds they are nearly or totally absent: in others

they are produced in such profusion as to entirely obliterate the separation between the ordinary tufts. In functional activity, as we shall find further on, they are not far behind the ordinary filaments.

I have had to treat so fully of the other portions of the plant while describing the structure of its main stem that but little remains to be said with regard to them, unless I were to go into details which would have small interest to those who are unacquainted with the technicalities of the subject. Before passing, however, from questions of form to those of development and reproduction, I must ask your attention for a few moments to some remarks I have to make on the subject of the origin of the slimy jelly in which the plants are enveloped, and which no doubt plays an important part in their preservation, possibly by preventing their being eaten by water animals. The only way of showing the origin of this mucilage is to cut a thin section across the main stem,—certainly not an easy operation, but still possible with care. When this is done we get an appearance something like Fig. 5. Here it will be seen that in the centre of the group there is a large, clear, circular space representing the central axis of large cells. Around it are a number of much smaller circles, the sections of the cortical filaments. Connecting all together and occupying the whole of the intervening space between the cells is a quantity of nearly transparent matter, the mucilage, indicated in the diagram by light shading. Now, it will be noticed that I have marked the walls of the small cells quite distinctly, while the central cavity has only a vague outline. This difference is not a mere accident of the drawing, but is intended to convey an idea of what is actually seen under the microscope in sections of this kind. In fact, the difference in the clearness of the walls of the two kinds of cells is the key to the answer of the question before us. If a sufficiently high power of the microscope be employed both the interior and exterior outlines of the walls of the cortical cells are clearly defined, but, though the interior outline of the central cell may be plain enough, the outer surface fades so gradually into the mucilage that it can hardly be said to have an exterior outline at

all. There is only one hypothesis that will satisfactorily account for these facts, and it is this, that the mucilage is the result of the alteration, we might almost say the decomposition, of the walls of the central cell. This explanation of the origin of the slimy jelly is so strongly supported by analogous cases, to which time will not allow me to allude, that there need be little doubt about its being the true one. As yet nothing is known of the details of the process of change in the walls of the central axis.

I now come to the most difficult part of my subject, the reproductive system. As might be supposed, in many points the phenomena agree with those seen in other *algæ*, but they are complicated by special modifications. Two modes of reproduction are normal, and others which may be considered as accidental are sometimes found. The latter I do not intend to deal with, as they are of rare occurrence, and for the most part confined to particular species. I shall, in the first place, describe the two processes up to the point when the spores are expelled from their cases, and afterwards treat the development from germination onwards as a separate department of the subject.

It will be most convenient to begin with the simpler of the two methods. If a careful examination be made of a mature tuft there will most probably be found at the tip of each branchlet one or two spherical, nearly colourless, cells; in rare instances even more than two such cells (Fig. 3). These cells may contain either spores or antherozoids, organs which I shall have to treat fully further on. At present we will consider the cells containing the spores. There is not much to be said about them. They appear to be filled entirely with slightly granular protoplasm, and show scarcely any visible change in their composition until the spores are ready for extrusion, when the protoplasmic masses shrink into the middle of the cells, the parts intervening between the masses and the cell-walls being occupied by liquid. Then, in each case, the cell-wall breaks and the protoplasmic mass slips out into the water, or perhaps more often, into the mucilaginous envelope; here we will leave it, and turn to the second mode of reproduction.

This, too, begins with the production of a round, colourless cell at the tip of a branch, but the cell is much larger than those which contain spores, and the branch bearing it is generally shorter than the ordinary ones. A change soon takes place in the shape of this large cell through the unequal growth of different parts. The increase in size still goes on, but the lower part of the cell grows in thickness as well as length, while the upper part scarcely thickens at all but lengthens rapidly, and in consequence becomes either cylindrical or club-shaped. The lower part is called the procarp, and the upper the trichogyne. Fig. 6 will show the form these organs take at this stage, and make the description I have given of them sufficiently clear, I think

So far the procarp and trichogyne are able to develop and perform their functions without any external aid, but beyond this stage it is necessary to call in another agent. This agent is analogous to, though perhaps not identical with, the pollen of flowering plants. Its mode of action is very similar, but there are slight differences between the two cases which need pointing out, and I will therefore describe the process as it is found in bead-moss, beginning with the origin of the cells which represent the pollen.

When speaking of the spores of the first kind, I mentioned that there were cells precisely like those containing them which were destined for quite another purpose. These are the antheridia, and they answer exactly the same purpose as the anthers of flowers, *i.e.*, they hold the antherozoids, or the bodies corresponding to the pollen. Like the spores, the antherozoids must be expelled from the cells; the course is the same in both cases. Indeed, there is nothing to distinguish an antherozoid from a spore. Soon after extrusion from its case the antherozoid, which at first is naked, becomes clothed with a thin cell-wall. Floating about in the water, and driven hither and thither by its currents, some of the antherozoids are sure to be carried sooner or later into the neighbourhood of the trichogyne, and, whether by chance or through some attraction exerted on them by this organ is not known, eventually come in contact with it. We can now follow what takes place in the trichogyne and procarp, having introduced the

required aid. The first event in the next stage is the breaking down of the walls between the trichogyne and the antherozoid, which we must suppose to be touching it. On the completion of this operation, the contents of the antherozoid pass through the gap and mingle with those of the trichogyne, and thus the mission of the antherozoid is accomplished.

A change soon becomes apparent in the procarp. Hitherto it has been in no way divided from the trichogyne, but now a wall is interposed between them, and the procarp takes upon itself the whole duty of carrying forward the development (Fig. 6). Authorities differ on the question whether the trichogyne remains after its functions are ended or withers away. The French botanist Sirodot is very emphatic in the expression of his belief in its persistence, and gives diagrams of the organ still attached to the procarp when the latter has reached a period in its development far beyond the point to which I have followed it, and from the care with which he has prosecuted his investigations one cannot help feeling that his authority is of very great value. Be this as it may, the question is of no very great importance to us at present, and I will, therefore, leave it undecided.

To return to the procarp. The next change which takes place is an unexpected one, for, in most plants, the fecundated cell itself develops into the essential part of the seed or spore. Here, however, the case is quite different. One by one swellings appear on the sides of the procarp, and each in its turn grows into a cell similar in form to those composing the ordinary filaments in the tufts. These again produce other cells, and thus in a short time a dense cluster of short branches, all arising from the procarp, is formed. The mass is further enlarged by branches rather longer than the procarp being produced from the cells immediately below it. These branches are termed by Sirodot the bracteiform filaments, on account of their purpose being to protect the reproductive organs, like the bracts or modified leaves of flowering plants (Fig. 7). At the end of each of the short filaments derived from the procarp may be seen cells exactly resembling those containing the spores previously described. They also contain spores

or shortly will do so, but, in order to distinguish them from the other kind, these are usually called oospores. The term is applied to all the spores of algæ produced by an act of fecundation resembling that which occurs in flowering plants. The ripe oospore on escaping from its enclosing cell, an operation which it accomplishes in the same manner as the other kind, is a naked mass of protoplasm. From this point, as I have already remarked, the course of development is the same in both kinds of spores, and therefore it will only be needful to follow one through its progress. Before finally leaving the spore-producing organs to trace the life of the spore, I may here introduce a few words on the distribution of these organs on the plant. Some species bear reproductive organs on the filaments of the tufts only, others have them equally distributed among the filaments of the tufts and the internodes; where, however, the internodal filaments are but slightly developed they take a proportionately minor part in the propagation of the species.

A spore though a mere mass of naked protoplasm when it first emerges from its case, soon surrounds itself with a thin membrane, and is ready to germinate immediately. The process of germination is in the first place a very simple one. A swelling appears on one side of the spore and gradually developes into a cylindrical tube, into which the entire contents of the cell are injected, leaving the cell-wall like a tiny collapsed balloon. The little cylindrical cell lengthens and divides into several new cells, and thus a long filament may be formed (Fig. 8). Becoming attached to a stone, the filament usually throws out branches in all directions, which lie flat against the support and often cover it with a thin film of interlaced threads (Fig. 2). With slight variations in the shape of the cells and the character of the branching, this is what takes place at the outset, whatever the species may happen to be; but what follows is dependent on several conditions. First of all the course taken is governed by peculiarities of the different species. Secondly, the physical conditions under which germination occurs, and the surroundings of the plants during their growth

have an influence, the importance of which can hardly be exaggerated, as I shall presently show. The simplest and, I am inclined to think, the most primitive course is found in many species, some of which possess the power to adopt a more elaborate form of development, should circumstances be such as to render the change advisable. In this simple course of development a velvety coating is formed on the support by the growth of short ascending branches from the procumbent ones, which immediately result from the germination of the spore. The whole of this structure is called the Prothallus. So far as can be seen, there is nothing to connect it with the full-grown plant of Batrachospermum. Indeed, its size is so very disproportionate to that of a perfect specimen, that one can hardly believe that the two are merely different stages of the same plant. That such is the truth, however, is proved by the fact that sometimes botanists have been so fortunate as to find among the ascending filaments of a prothallus a branch, the cells of which exactly resemble in shape and character those of the main stem of a perfect plant, before they are covered by the cortical filaments. The tufts are also represented in miniature at the upper extremity of each of these cells. No great stretch of imagination is required to trace the further development, and as I have already practically done so in an earlier part of my paper, I need not spend any time upon it now. I must, however, refer to one peculiar and, I believe, unique case, where the plant at this stage is able to reproduce itself by spores, such as I have described as being born by the mature plant. They are produced on the ascending filaments, and go through the usual process of germination. How the fact has been brought about, it is impossible to say; but the species whose prothallus is endowed with this strange power is almost, if not quite, sterile in the perfect stage, and, therefore, is entirely dependent for its preservation on the spores provided by the prothallus. In order to give a correct idea of the importance of the phenomena I have next to describe, I must glance for a moment at the state of our knowledge with regard to the development of Batrachospermum some ten years ago. At that period, the processes in the development of the oospores up

to the time of their extrusion, were pretty well understood, and the prothallus was recognized as a young state of the plant; but as the prothallus of some species could not be found, there was still a good deal of mystery about them to be cleared up. It was also known that with the species whose prothalli were wanting, there were often associated little plants, something like prothalli but larger, and composed entirely of cylindrical cells,—at any rate so far as their ascending filaments were concerned; whereas, the ascending filaments of ordinary prothalli are usually made up of barrel-shaped cells. Soon it was discovered that these little plants, forming velvety tufts of dark green filaments on the stones, could reproduce themselves by spores, and accordingly it was concluded that they were full-grown perfect plants. The name of Chantransia was conferred on the supposed genus, and several species were recognized. In Fig. 9, I have sketched one of the tufts of a Chantransia as it appears when growing on a stone, and but slightly enlarged; on the left hand will be seen a few isolated filaments. Fig. 10 shows a portion of one of these filaments much more highly magnified; spore-bearing cells are placed on the tips of its branches. These spores resemble in every point of form and development those of a Batrachospermum, and therefore need no special description. By-and-bye, the fact of Chantransia being almost always found in the same habitat with some species of Batrachospermum, together with its partial similarity to an ordinary prothallus, led some botanists to suspect a closer relationship between the two genera than had hitherto been supposed to exist. Owing, however, to the extreme rarity of the two plants being found actually mingled together, though growing in the same water, the problem remained unsolved till Sirodot commenced his elaborate investigations on the genus Batrachospermum. He soon became convinced that Chantransia was merely another form of Batrachospermum, not a distinct genus, and after much careful research and experiment succeeded in discovering the most emphatic proof possible of the correctness of his conviction, in a filament of Chantransia with one of its branches partially transformed into a young Batrachospermum. Still this was not

enough to satisfy him, for though the connection between the two forms was established beyond doubt, there still remained the question of what circumstances governed the development of the one from the other. In this case also his perseverance and ingenuity were rewarded with success. Watching carefully all the localities where specimens of either kind grew, and noting all the changes that were made in the surroundings of the water, he was able to prove that light and temperature were the two most active agencies. Several facts helped him to come to this conclusion. The first to attract his attention was this : in summer both forms might be found, but Batrachospermum was the more numerous of the two ; in winter, Chantransia was always to be seen at its best, while Batrachospermum was totally absent in by far the greater number of habitats. What better evidence could be needed to prove that Chantransia is the winter form of Batrachospermum ? The evidence for the effect of light in determining which form shall develope is equally conclusive. In several localities examined by Sirodot part of the water was shaded by stones or trees, while the rest was open to the direct sunlight. In almost all these instances the two forms could be found, not spread over the whole area, but restricted within well-defined limits. Chantransia always occupied the shaded part, and Batrachospermum that open to the light. If further proof were required, it was supplied by two most remarkable facts. The stone which shaded the top of a well in which Chantransia was very abundant and Batrachospermum almost if not quite absent was removed and the light admitted. A change took place immediately, and Batrachospermum made its appearance. Another well containing Batrachospermum, and of course unshaded, was covered by a flagstone for some purpose ; almost as rapidly as in the former case Batrachospermum developed, it disappeared here and was entirely supplanted by Chantransia.

When the connection between the two genera was proved thus beyond question, it became necessary to settle what species of Chantransia corresponded to the different species of Batrachospermum. Considerable difficulty was experienced, but the relationship

in some cases was satisfactorily established. It was also found that specific differences, clearly visible in the Batrachospermum form, were absent at the Chantransia stage. Thus what had at one time been taken for a well-defined species of Chantransia might change into a variety of species of Batrachospermum. There is at least one species of Chantransia which we have reason to believe never changes into any other form. It is chiefly remarkable for being the only species known to produce oospores like those of Batrachospermum.

In conclusion, it may interest members of the Society to know that the bead-mosses have one representative in this district. I have not yet succeeded in naming the species.

[NOTE.—The diagrams, with the exception of Fig. 1, which is original, have been roughly copied from Sirodot's magnificent work, "Les Batrachospermes." The selection was not confined to one species, those figures being chosen which in each case showed most clearly the character to be indicated.]

COAL SMOKE.

By T. STENHOUSE, F.C.S., F.I.C. Read 3rd April, 1891.

DURING recent years increasing attention has been paid in almost every English town to what is commonly known as "The Smoke Question." At the present time much money, thought, and labour are being expended in order to ascertain how best to reduce the admitted evils arising from the imperfect combustion of the ordinary mineral fuel coal.

Even two hundred and thirty years ago the loss and inconvenience arising from coal smoke did not pass unnoticed, for Evelyn, the author of "*Sylvia*," in 1661, in a letter or work addressed to King Charles II., describes coal smoke in the following words:

"This is that pernicious smoke which sullies all her glory, superinducing a sooty crust or fur upon all that it lights, spoiling the movables, tarnishing the plate, gildings, and furniture, and corroding the very iron bars and hardest stones with those piercing and acrimonious spirits which accompany its sulphur, and executing more in one year than to the pure air of the country it could effect in some hundreds. It kills our bees and flowers abroad, suffering nothing in our gardens to bud, display themselves, or ripen; and it was by many observed that in the year when Newcastle was besieged and blocked-up in our late wars, so as through the great dearth and scarcity of coals these fumous works were either left off or spent but few coals in comparison to what they now use, gardens and orchards planted even in the heart of London were observed to bear such infinite qualities of fruit as they never produced either before or since, to their great astonishment; but it was by the owners rightly imputed to the penury of coals and the little smoke which they took notice to infect them in that year."

Quite recently the question was brought before Parliament, and able writers have been discussing the subject of fogs and their connection with coal smoke. That this smoke is injurious to health, to vegetation, and to property of almost every description is admitted on all hands. To those who have studied the question it is also well known that the smoke from household fires—

poured into the atmosphere as it is at a very low level—is, in the aggregate, quite as injurious as the total smoke emitted from factory chimneys. It has been estimated that London's daily cap of smoke weighs at least 300 tons, and represents a loss of at least £100,000.

A correspondent, writing to *Nature* on the darkness of London air, says :

"Londoners need not be surprised to find black fogs, when it is a fact that tons of soot float in the atmosphere every day. Hoping to get some fact on the subject I collected a patch of snow, equal to one square link, that had lain from November 27th to December 27th last, and from which I obtained two grains of soot. Now, supposing London to cover 110 square miles, it would produce 1,000 tons of soot. Imagine a month's allowance being drawn off in a line by 1,000 horses ! This line would extend to about four miles in length."

There is a popular belief that the visible soot is the sole impurity arising from the combustion of fuel. This is not so, as every user of coal, however smokeless the combustion, contributes something to the fouling of the atmosphere, owing to the inevitable production of sulphurous acid, carbonic acid, and sometimes poisonous carbonic oxide gas.

There is, on the average, more than one per cent. of sulphur in coal, and this element, when fully oxidised, yields three times its own weight of sulphuric acid—one of the most corrosive substances known. Now, when coal is imperfectly burned and smoke is produced, not only is there a loss of good fuel but local fogs are produced when the air is still and moist, and everything becomes smeared with a sooty covering. Besides this, the injurious acid compounds just named are more or less absorbed by the spongy carbon and brought to the earth, instead of being readily diffused through the atmosphere as would be the case if no sooty particles were present in the products of combustion. In fact, too great a stress can scarcely be laid on the great mischief done by the quick return to the earth of the sulphurous fumes which are always produced when ordinary coal or coke is consumed in the usual way. It is this sulphurous gas which causes the atmosphere, as well as the rain falling over our town, to be

distinctly acid. It is the emission of the sulphurous acid from the funnels of our tram engines which makes it so unpleasant to ride on the top of an open car.

In some experiments recently made in Manchester by the leading chemists at Owens College, it was found that in three days' fog there was carried down per square mile in the neighbourhood of the Infirmary nearly six cwts of sulphuric acid, while at the College the amount was over four cwts., and the "blacks" over two tons. During the first six hours of March 1st of this year, that is, during the night, there were brought down by the rain acid compounds equal to 196 lbs. of sulphuric acid per square mile in the centre of Rochdale. The mills had all been stopped for about twelve hours before any of this rain was collected.

In foggy weather, when drizzling rain is falling and the mills are all at work, much more acid is generally brought to the ground than the quantity given above.

In this way clothes, books, pictures, furniture, &c., are acted upon to a far greater extent than an ordinary observer would imagine. Sulphurous acid is also a bleaching agent, and therefore causes some colours to fade, or, may be, destroys them altogether. There can be no doubt about the accuracy of the calculation which gives three million tons of sulphuric acid as the quantity produced by the combustion of the 130,000,000 tons of coal annually used in Great Britain.

Before further considering the question of smoke it will, perhaps, be as well to briefly glance at coal itself. Coal has been somewhat fancifully described as "fossilised sunbeams," "bottled-up sunshine," &c. There is no doubt now as to its origin, as it is known to consist of fossilised trees and ferns, which lived and grew to a hundred feet and more in height when the climate was far more tropical than is the case at present in this country. It is, therefore, the remains of a former flora, and the result of a partial decomposition which woody fibre has undergone during long ages whilst buried in the earth and excluded from all atmospheric agencies. The older the coal, the greater the difference there is between it and the woody fibre from which it was originally

derived. The oldest kind is anthracite; it contains a high percentage of carbon, and when burned gives no smoke and scarcely any light. The most recently formed coal contains far less carbon but much more oxygen and hydrogen, besides retaining the fibrous structure of the original wood. This variety is sometimes called lignite, and belongs to a more recent geological formation than that of chalk, whilst true bituminous and anthracite coals are older than the chalk.

Ordinary bituminous or smoke-producing coal, contains nearly 80 per cent. of carbon and between 5 to 6 per cent of hydrogen. If this solidified hydrogen could be set free it would become gaseous and occupy nearly 1000 times as much space as the coal itself. When raw coal is first heated by being thrown on a fire, the hydrogen is driven off. A portion of it comes away in the free state and readily burns. The remainder of the hydrogen combines with some of the carbon, sulphur, and nitrogen of the coal, to form a great number of dense vapours, which if not thoroughly oxidised or burned at once, give the ordinary black smoke with its accompanying sulphurous fumes. As the hydrogen gas rushes from the heated coal, it has the wonderful power of chemically combining with a far greater weight than itself of carbon to form gaseous compounds which, as has been stated, may be readily lost. For instance, in one of the products known as olefiant gas, one pound of hydrogen has laid hold of six pounds of carbon, and in the benzole series of vapours which rush off from heated coal, one pound of hydrogen is in combination with twelve pounds and upwards of real carbon.

It will thus be noticed that the immediate cause of smoke-yielding vapours is the presence of hydrogen in ordinary coal, and many of the substances first formed by the hydrogen uniting with the carbon have the remarkable property, that when slightly heated, they break up into simpler gases or vapours and free carbon, this latter easily escaping combustion if there is either an insufficient supply of air, or if the temperature of the furnace or fire place is too low.

During recent years numerous attempts have been made to suppress the smoke and noxious gases arising from the combustion of ordinary coal in boiler fires. Recently a mysterious liquid was used for this purpose at a public trial held in Willis's Rooms, St. James's. The liquid was offered for sale and was found to consist of a strong solution of common salt, which when thrown on to the coal was decomposed with the evolution of hydrochloric acid fumes. No one however would tolerate this nuisance for any length of time. Another modern plan, and one which has been extensively advertised in London during the last few months, is to wash the smoke and acid gases by forcing them by means of a fan through a tank of water before allowing them to pass into the air. Some of the objections to this arrangement are that a certain amount of power is necessary to work the fan, a constant supply of water is also required, and a very foul effluent water has to be disposed of.

Jets of steam, forced draughts, hollow fire-bars, and split bridges have also been tried with indifferent success for the suppression of black smoke.

Far superior to any of these is the mechanical stoker. This is of two kinds, the sprinkler and the coker. In the former the coal is periodically sprinkled over the fire, and from the chimney a stream of moderate smoke is always being emitted. In the coking mechanical stoker the coal is gradually fed on to the dead-plate at the front of the boiler, and slowly worked backwards by a motion of the fire-bars. This motion also keeps the ashes and clinker loose, and a free passage for air between the bars is obtained. The smoky vapours given off from the raw coal travel over the whole of the fire or grate surface, and when there is anything like a fair supply of air there is almost perfect combustion, and consequently little or no smoke produced. With this apparatus there is no opening of doors which allows an inrush of cold air; there is a regular supply of coal; the supply of air is uniform, and can be regulated to a great nicety; a very high temperature is maintained over the fire, and nothing capable of being burned escapes combustion. I have seen many of these at

work and they give every satisfaction. I believe Rochdale is the only large town in Lancashire which does not, or lately did not, contain one or more of these modern cokers at work. The so-called sprinklers seem to have met with greater favour in this district. Messrs. Kelsall & Kemp have perhaps the best of these in operation at the present time. Probably one or two manufacturers tried both forms of these mechanical stokers many years ago, but did not obtain any great advantage from them. During the last three or four years, however, many improvements have been made in these appliances, which now make all the difference between success and partial failure.

That some of these mechanical stokers are very efficient appliances may be gathered from the fact that only last year the very successful firm of Messrs. Brunner, Mond, & Co., the large chemical manufacturers of Northwich, whose works are conducted on the most scientific principles, put coking stokers to 36 boilers at their Winnington works. This order was the result of a number of trials the firm had been making for the suppression of smoke. Several large mills in Bolton and other towns are also using this coker with the best effect.

It is impossible to obtain the full evaporative power from a hand-fired Lancashire boiler, using ordinary coal, without producing dense smoke and waste of fuel. The following considerations will show how this happens. In a hand-fired boiler it is quite possible to burn about 12 lbs. of coal per foot of grate surface per hour, with practically no smoke. In many places, however, twice this amount of coal, at least, is got through, but not without dense smoke being formed and sent into the atmosphere. This amount of fuel, 24 lbs. per square feet of grate surface per hour, equals about 3 cwts. in half-an-hour in an ordinary Lancashire boiler (30 feet by 7). Reckoning 220 cubic feet of air for every pound of fuel, about 13,000 feet should pass into the furnace every five minutes, assuming the coal to be uniformly burnt. This, however, is not the case; for a newly-fired furnace will, in five minutes throw off from the raw coal—which should last half-an-hour—gases and smoke-producing vapours equal to one-third the weight

of the entire charge of 3 cwts. During the next twenty to twenty-five minutes the remaining two-thirds of the 3 cwt. charge will be consumed. This latter portion will consist chiefly of coke, when the volatile vapours have been driven off. Now, how will the air supply act under those conditions? During the first five minutes, when the volatile matter is streaming off and filling the furnace, the air will not be able to gain access in sufficient quantity, although this is the time when the largest amount is required. One pound of the volatile matter just referred to, requires for its complete combustion far more air than is necessary for one pound of carbon or coke. Besides this, the cold raw fuel and the cold air admitted during the process of firing-up, diminish considerably the temperature of the furnace, and this to such an extent, that a portion of the gaseous matter will not burn, though in contact with sufficient air, owing to the mixture being below the ignition temperature. Hence we see that the cause of smoke in a hand-fired boiler when the furnace is newly charged, is an insufficient supply of air, and a temperature too low to allow of complete combustion of the carbonaceous vapours. This also accounts for the large excess of unused air often found in the chimney gases of this district, even during the emission of black smoke. A brief consideration thus shows how inferior is the best hand-firing when compared with the regular and uniform combustion going on in the furnace of a boiler fit up with a mechanical stoker, such as has been briefly described. I am not one of those, however, who believe that the atmosphere of this or any similar town, would become of Alpine clearness if every factory chimney became smokeless. No doubt there would be an improvement, and much good fuel saved which is now lost. But the coal smoke from our domestic fires, emitted within a few yards from the earth would, in my opinion, still often give us an unpleasant and unhealthy atmosphere. London, for instance, is admitted to be one of the most smoky and fog-bound cities in the world, and no city in the world is so free from black manufacturing smoke. The great number of domestic fires gives the metropolis its smoke, and until these are altered or the fuel changed, there will be no appreciable improvement.

It will take a great deal to reconcile an Englishman to the absence of his beloved open fire, though every open fire-grate in which ordinary coal is used produces plenty of smoke, and allows at least nine-tenths of the heat to pass up the chimney without doing any good. Nothwithstanding this, who does not feel that there is something wanting in a room heated otherwise than by an open fire, say in our new station waiting rooms, although these are well heated by steam pipes. On a small scale super-heated steam is being used in America for warming houses. In the slow combustion stoves, and in the charcoal fires common on the continent, there is an absence of smoke. In the combustion of the so-called patent fuel, made from small coal, a little pitch, and a small quantity of lime, there is little smoke and practically no corrosive sulphurous fumes. The lime combines with the sulphur and causes it to stay in the ashes. The use of smokelessly burnt coal-gas for cooking and purely heating purposes, for gas engines, and many small mechanical operations, is one which will probably be greatly extended, especially when the price of the gas is reduced so that its employment as a fuel will be cheaper than that of coal. Recently many able men have strongly advocated the manufacture of a cheap heating-gas for every large town, so that as little coal as possible shall be used in the old wasteful way. This seems very plausible when it is pointed out that the materials required to make this kind of gas are simply water and coke. The necessity for doubling most of the plant of a gas works—the gas holders, mains, meters, etc.,—in such a scheme, is only very lightly considered.

Personally, I think this scheme, or some modification of it, will be largely adopted in the future—perhaps in another quarter of a century.

OUR LOCAL PROBLEM OF POVERTY.

By Rev. R. VEITCH, M.A. Read 8th January, 1892.

NO apology need be made for introducing the subject of our Local Problem of Poverty. Much has been said; there is much more to say, and still much more to do, before we arrive at an even tolerable condition of general comfort and happiness. None need dismiss the subject as uninteresting. It touches the well-being of men and women at our side; of fellow-townspeople; of brother Englishmen. Some of those whose interests are discussed, it may not be flattering to include under such categories. But no analysis of our social life, or of our general well-being can leave them out. They affect the economic, intellectual, and moral standard of our community. The subject, therefore, besides being interesting, is most important. No large or buoyant faith for our own life can be cherished apart from a faith in the redemption of men of all grades and conditions, and no redemption in another world is well-based except as the counterpart and outcome of social progress in this.

Let me invite you, then, to the earnest consideration of our topic.

1. GENERAL CONDITIONS.–The general conditions are summed up in the existence of what is spoken of broadly as "the submerged tenth."

Mr. Mulhall, who is quoted in the *Industrial Remuneration Conference*, has said that "all indications point to the conclusion that the number of persons in easy circumstances, or at least above want, is increasing much faster than population." The ratio of paupers to population was 4·79 per cent. in 1870, 3·29 per cent. in 1880, and 3·1 per cent. in 1882. Yet here is 3 per cent. of our population who are thorough paupers. This, too, is no measure of the extent of abject poverty. "More than 10 per cent. of those who die in a year die in workhouses or hospitals,

and this mortality represents a population of two-and-a-half millions;[1] so that nearly three-and-a-half millions of the population are either actual paupers, or in such poverty as to have been driven across the borders of pauperism by illness. Allow for those who just escape these conditions, and the number of persons who live miserably on the verge of pauperism cannot be less than five millions. This is a *submerged seventh.*

Charles Booth, in *Labour and Life of the People*, vol. 1, treating of a population of 891,539 in Whitechapel and adjoining districts of London, shows that 35 per cent. are to be classed among the poor. They belong to families earning less than twenty-one shillings per week, the best of whom are in want if sickness comes or employment is irregular. One in every four adults in the richest city in the world dies dependent on public charity.[2] One in every four of those who attain the age of sixty-five becomes a permanent pauper.[3]

2. Causes of Poverty generally.—These are found to be

(a) Irregularity of employment. Even in skilled labour there are periods of great irregularity. The unemployed in skilled trades varied from 13·3 per cent. in 1886 to 1·75 per cent. in 1890; in shipbuilding and boiler-making the figures were as high as 28 per cent. in 1886, and as low as ·89 per cent. in 1890.[4] "Of the thirteen millions composing the 'working-classes' in this country, nearly two millions are liable at any time to figure as waste or surplus labour."[5]

(*b*) The housing and food supply of the poor are comparatively bad in quality, and dear as well. "In Liverpool, nearly one-fifth of the squalid houses where the poor live in the closest quarters are reported to be always infected, that is to say, the seat of infectious diseases" *(Royal Commission on Housing of the Working Classes).*[6] The food of the poor is bought generally in small quantities: groceries by the ounce, coals by the cwt.

[1] Page 89: *cf.* p. 101, *Remun. Conf.*
[2] Page 19, Hobson.
[3] Page 22, Hobson.
[4] Pages 15 and 16, Hobson.
[5] Page 17, Hobson.
[6] Page 12, Hobson.

(c) Thriftlessness and drunkenness. The people are ignorant of the best uses of small earnings. They spend starvation wages on that which is not bread. The expenditure on drink is annually 130 millions sterling more or less.

3. There are CERTAIN PROPOSITIONS which need to be admitted if we are to make any headway in this controversy.

(a) There are honest persons in England who have done what they could, and yet are destitute. We must admit that there is much unnecessary, self-caused destitution, and that many are destitute through the folly and sin of their parents. But long illness, misfortune, irregularity of employment, may gradually bring the well-intentioned and industrious low. The testimony of the writer of the *Bitter Cry of Outcast London* was (p. 9): "Notwithstanding the sickening revelations of immorality which have been disclosed to us, those who endeavour to earn their bread by honest work far outnumber the dishonest." The testimony refers to the class of the indigent poor. The few honourable, but destitute persons—if they be few—should be objects of our earnest care. We should assist them to stand on their feet again as quickly as possible. They are most unjustly lumped with the worst class, and we have no system of self-acting discrimination. They necessarily swell the ranks of those competing for the most poorly paid labour, and so increase the misfortunes of their class. Let us deal more justly with these, and then we may deal more severely with the incorrigible remainder.

(*b*) The thriftless and drunken are also our care. They are objects of Christian charity. Out of love we should seek to make them true and worthy citizens. They are sources of shame and danger to any State. They furnish our criminals; lower the tone of public morality; form hot-beds of disease as they huddle together in poor dwellings; lower the wages of all classes of workmen who do not protect themselves; and retard the material progress of the State. We are in part responsible for the condition of these people. They are products of our social life.

(c) The thriftless, if they are numerous, and the thrifty who have become destitute are a blot on any prosperous State. Our State cannot plead excuse: it is not poor, and it has not accepted Pessimism for its faith. In the years 1865-75, England's wealth (not income) increased 240 millions per year. A penny in the pound on the income-tax yields £2,000,000. If this penny were applied to effectively assist those who are out of work back into the ranks of the employed, it would not be difficult to treat a million of the population satisfactorily.

(d) As an economic point it must be remembered that, if they were remuneratively employed, the destitute would create their own demand.

4. There are GENERAL PRINCIPLES which may be laid down as to the treatment of the problem.

(*a*) It is partly moral, and is dependent for remedy on the religious inspiration. It is by love the outcast is redeemed.

(*b*) But the problem is also economic, and one for statesmanship.

(*c*) It is the duty of the State to care for the weak,—for its economic cripples,—as it is the duty of the family to care for the child, and be specially tender to the maimed ones.

(*d*) We should be slow to make out-and-out paupers: quick to pick men up on the way to that condition. We should maintain freedom and self-reliance as long as possible. There should be some chance for the destitute before being cast into the pit of pauperism.

(*e*) Every able-bodied person should have the alternative of work or hunger set before him, but we should not ask men who have committed no crime to do the task-work of criminals.

We turn now to our LOCAL PROBLEM.

It has been necessary to recount the general conditions of poverty in the country that we may deduce some local conclusions, for no Commission of Enquiry has yet been instituted in Rochdale, and the work could not be done by any single individual.

1. What is the *state of Pauperism* here then? For pauperism proper we have actual figures (kindly furnished to me by Mr. R. A. Leach, Clerk to the Guardians). For the week ending

January 2nd, 1892, outdoor relief was granted to a population of 1,149 to the amount of £106 8s. 10d. = 1s. 10d. per head. On Saturday, January 2nd, 1892, there were in the Workhouse 453 persons; 25 being healthy and able-bodied, and 90 of unsound mind. To these add 42 children in certified and other schools chargeable to the Rochdale Union, and we have a total of 1,644 paupers to a population of 123,910 at the end of the year 1891. This is about 1·3 per cent. If 245 lunatics in asylums be added (? all chargeable to the Union) the percentage is 1·5, the total number being 1,899.

The number of vagrants at Dearnley during 1891 were

Adult males..	11,373
,, females	633
Children under 16 years of age.	318
Total.....	12,324 = 33·7 per day

This daily total added to the previous numbers gives 1,932 persons, or 1·56 per cent. of population.

We cannot strictly apportion to *the Borough* its own share of this pauperism. The records for the Borough and the remainder of the Union are not kept separate. But for outdoor relief the figures have been taken out, and assuming the same proportion to hold in all the figures, then the Borough has 1,340 paupers chargeable to it, or nearly 1·9 per cent.

This, then, is our only present basis of calculation, and all we can say is that we probably have a *submerged eleventh* instead of a *submerged seventh;* or, out of a population of 71,401, we shall have about 6,500 people, or say 1,400 families "who live miserably on the verge of pauperism."

Personally, I had hoped and expected that our figures would turn out more favourably than this. They need to be checked, but they may perhaps be taken as roughly true. My expectations of a more favourable statistic were based on these facts:

(1.) There is a good variety of employment in Rochdale, and a fair regularity. If one trade be depressed, others may be in tolerable prosperity.

(2.) Female employment prevailing, at least secures that a family shall, for the most part, not be dependent on one bread-winner.

(3.) Food, I should say, was cheap, and the co-operative distributive system has established a custom of ready-money payments.

(4.) The housing of the poor is not markedly bad or high-priced, although there are many places which should be condemned as insanitary, and the owner should be compelled to supplant them with habitable dwellings.

There was one well-known condition prevailing which roused the opposite expectation or fear. Our Drink Bill for the Borough is not less than a quarter of a million (£250,000) per year. That expenditure, we know, is largely productive of poverty, shiftless incompetence, lunacy, and crime. Otherwise expended the money would be ministering to our commercial prosperity, and might furnish maintenance for 12,000 more people, or roundly *one-sixth.*

2. This, then, is our Local Problem now fairly placed before our eyes. The chief thing I have to say is that it requires *a local remedy.* Were I straightway to propound to you a complete scheme, I should probably thereby earn the name of charlatan. I wish to be no quack. Let me rather insist on the need for this LOCAL REMEDY.

We have local conditions to meet, and must meet them with local knowledge. No single scheme may be patented for the whole country. It is contrary to experience that great problems should be solved by rough and ready methods. The nation will find social emancipation if the many local communities will each discover their own. The different causes of poverty must each be met by its appropriate remedy. What will lessen irregularity of employment will not directly affect the drinking customs; the way of redemption for the honest poor may not prove the way for the thriftless and the vagrant now habitually such.

On many points we require more reliable information, and I would commend, as worthy of imitation, the work of the Committee which enquired into the condition of *The Bristol Poor,* and presented its report in December, 1884, to the Bishop of

Gloucester and Bristol—a work in which our own Vicar took no small part. It gathered information respecting :

The Dwellings of the Poor,
Education and the Poor,
Intemperance,
Immorality,
Recreation,
Visiting and Teaching among the Poor,
Almsgiving,
Charities, and
Poor-Law Relief.

Some association of men and women interested in the solution of our Social Problem should charge themselves first with this enquiry.

3. Must the remedy be PRIVATE or PUBLIC; must we look, that is, to voluntary philanthropists or to state or municipal bodies? My own answer is—BOTH. General Booth has brought out clearly certain guiding rules :

(1.) Provide work. Give shelter and food as cheaply as possible for equivalents of work. So respect self-reliance, and preserve men from becoming paupers.

(2.) You may provide work of kinds such as are not already taken up, *e.g.*, that of the Household Salvage Brigade ; or (if you are prepared to lose something), from amongst sweated forms of labour (match-box making and sandwich men).

(3.) Unite religious influence with efforts at physical and social redemption.

Private persons manifestly can go further here than public officials.

4. But I hold that there are certain minimum rights of the citizen, and among them the right to protection from the worst results of the system of competition. Competition is healthy, but it has its limit of beneficial activity. The honest poor may claim that they should not be suffered to be driven completely against the wall. They may claim what General Booth calls "the Cab-horse's Charter,—'When he is down he is helped up, and while

he lives he has food, shelter, and work'" (p. 20). Hence I advocate the establishment of State Workshops as an extension of our present poor-law system. The institutions should be workshops and homes combined, where the able-bodied and self-respecting might find employment and shelter and food. They should be self-acting discriminators between the pauper proper and the unemployed. Their existence would justify us in strictly carrying out the law against vagrancy.

I can only sketch here what is meant.

(*a*) Everyone should be able to claim employment and the opportunity of earning shelter and food, and should be free to come and go.

(*b*) He should be credited with his labour at, say, two-thirds the market prices, and debited with his maintenance, and be able to claim the balance when he leaves.

(*c*) The character of work should be such as is performed in sweated or under-paid employments. State workshops might for some mean State farms.

(*d*) There should be in connection with the workshop—1. A Labour Bureau, which published twice a week all the chief demands for Labour. 2. A system of State-directed Emigration to draft off the surplus labour as it evidently accumulated.

There is no idea of compulsion here throughout.

5. That, however, will require new powers to be conferred on the Guardians. They are not authorised to pay *any standard* wages to vagrants. *What could we do meanwhile?*

Pardon me if I again refer to the scheme published a few months ago.

(*a*) Our first and main attack might be on the Drink Traffic. In a philanthropic and missionary spirit cannot a number of Teetotums be established in the most drunken quarters of the town? We do not complain of the Coffee House Company. They have a right to work the Company as a business, and to pay 15 per cent. Their success is proof that further success may be achieved. Temperance sentiment is much more widespread than it was, and

attempts made some years ago can scarcely be cited against the probability of success now.

I suggest that, in each of these houses, a FREE-AND-EASY FORUM be held on Saturday evenings. I mean a combination of the ordinary Free-and-Easy Entertainment with a discussion during some part of the evening on a topic of the week. Charges: Penny admission and refreshments according to order, each one being expected to expend, at least, twopence. The Teetotum should be made as attractive outwardly, and afford as much accomodation within as the public-house. Unless some headway be made against the Drink Traffic, the larger part of the evils of poverty will remain.

(*b*) We want better Lodging-Houses, and these, as well as the Teetotums, might be made to pay.

(*c*) If the Lodging-Houses were connected with a Shelter, religious influence could be brought to bear on the frequenters of both. The Shelter seems to be a necessity. Private philanthropy must probably lead the way before the State will take up the establishment of State Workshops. General Booth's work is, broadly speaking, on the right lines, but the social redemption of the country must not be left to one organisation.

6. The local authorities need to be stirred up and heartily supported in forward action in reference to the abatement of the smoke nuisance, abolition of insanitary dwellings, and the provision of opportunities for healthy recreation. The surroundings of life help men to be cheerily good, or morbidly and heavily corrupt. Each local community must do its share, or the result will be a further massing of the unfortunates in large centres, and a further hopelessness of remedy.

Here, in Rochdale, the ground of hope and summons to action lies in the fact that our poverty is, as some would call it, not excessive. Let none find there a reason for leaving it where it is.

Let none say either that here we have preached State Socialism. We only propose that the State should protect the weak at the

bottom of the social ladder. Competition is left to its full effectiveness higher up. We must see that each one inherits freedom of manhood. The freedom of the starving is a shame and a mockery, and, in a country like ours, a sin against man and against high heaven.

Do some not agree with me? I only ask that we should be agreed about one thing, viz.: There is a local problem of poverty, and we are obligated to meet the problem in some way. The question may remain "What way?" but intelligent and capable and devoted citizens can find it.

ROCHDALE SURNAMES.

By HENRY FISHWICK, F.S.A. Read 22nd January, 1892.

THE study of the meaning and origin of surnames has long been a favourite pursuit of the etymologist, and many treatises and learned books have been written on the subject. Nearly three hundred years ago William Camden, the historian and antiquary, and Richard Verstegan, both published essays on the origin of surnames; and since their time so many kindred works have appeared in which such diversity of opinions are offered, that one is almost forced to the conclusion that any given surname may be made to appear to have sprung from any quarter of the inhabited globe, and to have at least half-a-dozen meanings, no two of which bear the same significance. The fact is that this study presents a field for investigation, which appears so easy to those who know little about it, and which is acknowledged to be surrounded by many difficulties by those who have deeply and carefully considered the question. To guess or to dogmatise is simple enough, but to bring forth proofs is quite another matter.

Into this controversial arena we have no intention of entering, but rather propose to accept the surnames as we find them, and to endeavour by marking their entrances and exits, their limitations and distributions, to extract from them such information as may be of interest to the historian, the antiquary, or the general student.

It has been said that England might easily be subdivided into districts, the distinguishing features of which should be the surnames of the people; just as the various dialects, once the common language of the inhabitants, point to the district races which formed the bulk of the early settlers.[1] In thus dealing with the names of our Rochdale forefathers, we shall be on unbroken

[1] See Guppy's *Homes of Family Names.*

ground, and cannot fail to unearth facts and details of some interest and value. The exact date when hereditary surnames were introduced into this country is uncertain,—by some antiquaries it is maintained that they were unknown before the Conquest; on the other hand, the discovery at an earlier date of double names, the second of which has every appearance of a family name, renders this at least doubtful. In a grant made to the abbot of Croyland[1] in 1051, occur such names as Gunter Liniet, Onty Grimkelson, and Turstan Dubbe. The Domesday Survey contains a large number of undoubted surnames, though not many of them are found in the portion relating to Lancashire. In the Blackburn Hundred, for example, we find an Albert Greslet. The *Testa de Nevill*, which is believed to have been written early in the fourteenth century, furnishes many Lancashire names which were evidently patronymics. Thurston Banastre, Cecilia Banastre, Robert Banastre, Albert Bussell, Richard Bussell, and Warin Bussell; others such as Richard de Frekelton, Roger de Frekelton, Henry de Stretford, and Hugh de Stretford, may refer either to the various members of the same family or to individuals no way related, but holding land in the places indicated. That the custom of adopting surnames was still only very partially in use is evident from the frequent occurrence of such names as Roger of the Assart (*i.e.*, a place cleared of timber), Walter of the Mill, Robert the Fletcher (*i.e.*, the arrow maker), John the Smith, William the Carpenter, and a host of others.

It may be safely assumed that except amongst a few families in Lancashire, the use of surnames was not common in the fourteenth century, and that its introduction would be of very slow growth; indeed, it has been stated with some reason, that it was not until the time of the Reformation[2] that patronymics were anything like universally adopted. The Rolls of the Preston Guilds give a very accurate idea how the use of surnames developed in the north of Lancashire; in 1397 only about 25 per

[1] Gough's *Hist. of Croyland Abbey.*
[2] Lower's *English Surnames.*

cent[1] of the burgesses are distinguished by surnames, in 1415 the average is very little in excess of that; but in 1459 it is nearly 70 per cent., whilst in 1542 every individual on the Rolls has a surname. In a district like the wide-spreading parish of Rochdale, where for centuries the population consisted very largely of yeomen and small farmers—who were a race not given to wandering to and fro in the earth,—the disappearance of an old name and the entrance of a new one is not difficult to detect. In some parts of England large numbers of Flemings and other foreigners from time to time settled in various districts, in such numbers as to quite alter the characteristics of the original race; but this was not the case in Rochdale, at all events to any great degree, until a comparative recent period.

One of the earliest surnames connected with Rochdale is that of Elland,—one of which family, John de Elland, is in 1238 described as of "Hallstedes" in Whitworth; here we have a clear example of the adoption of the patronymic. This was a Yorkshire family, and though until the fifteenth century they held land in Rochdale, none of them, except the one just named, appear to have lived in the parish, and the surname did not survive. In a compotus of the Earl of Lincoln, dated 1295, we have the names of several tenants of the Manor of Rochdale; amongst them is Hugh de Elaunde, John de Byrun, Adam de Balgschae, and there is a Henry, son of Richard, son of Henry, and a Henry, son of Patrick. The Byrons came from France and were settled in Nottinghamshire in the time of Edward I., and although some of them lived in Lancashire and for several generations were Lords of the Manor of Rochdale, the name does not appear in the parish except as applied to members of this particular branch. The name of Balshae, or Balschaghs, soon disappeared; they seem to have held the office of Bedell under the Manor, and took their name from a place called Balschagh in Healey (now

[1] This is based on the assumption that the "de" only denoted the place where the burgess lived, which had not yet become the family name.

unknown).[1] From two records dated respectively 1332 and 1335-6, we are enabled to get a pretty accurate list of the names of the principal inhabitants of the parish at that period. The earlier MS. is a subsidy roll containing the names of all those who were taxed for fifteenths and tenths, and the latter one refers to the transactions at the Manor Court. The names referred to may therefore be relied on as being an accurate and fairly complete list of all those who were likely to be distinguished by patronymics. For convenience of classification they may be divided into the following sections: I.—Place names, that is with the prefix *de*. II.—Descriptive names, including trade names. III.—Distinct surnames. IV.—Christian names only.

Place Names.

Aulus,[2] John and Ameria de (of the Hall).
Baumford, Elias and Richard de. Burton, Henry de.
Belfield, Adam, Henry, Richard de. Byron, Richard de.
Butterworth, Henry, Adam, Richard, William, and Geoffrey de.
Brodelegh (or Bradelegh), John and Adam de.
Bukklegh or Buckley, John, Christiana, and Alicia de.
Birdeshall [Buersall ?], John and Adam de.
Boche, Richard de (Boche no doubt intended for Bothe).
Crawshagh, William de. Castleton, Nicholas de.
Clegge, Nicholas, Geoffrey, Michael, and Agnes de.
Crofte, Richard de. Clogh, Roger de.
Crosslegh, William and Roger de.
D'ernlegh, Roger de. Dene, Richard and Adam del.
Foxholes, Adam de. Grene, Dande del.
Hayward, Galfred and Robert de.
Heghlegh or Heley, Adam, Robert, Michael, and Dande de.
Hall, Thomas de and John del.
Hill, Geoffrey, Mary, and William del. Holder, John de.
Howarth, William, Robert, Mary, and Richard de.

[1] *History of Rochdale*, p. 87.
[2] Another form of "del Hall."

PLACE NAMES.—*Continued.*

Hopwood, Nicholas de. Holt, Thomas del.
Horwicke, Thomas de.
Kirkeshagh, Thomas, Matthew, and Christiana de.
Kirkdale, John de. Milnhouse, John de.
Mosiley, Alexander and Dande de.[1]
Neuham, Roger de. Okinrode, Hugh del and Thomas de.
Oxsilegh, Dande de. Radcliffe, Robert de.
Paris, Adam and Margota de.
Ramsden, Geoffrey and Cecil de.
Shore, Nicholas and William del.
Slaveden [Sladen ?], Henry and William de.
Slakes or Slak, Nicholas, Thomas, and John del.
Siker [probably intended for Sikes], William de.
Stanesfeld, Randulf and Thomas de.
Scholefeld, William del, and Adam and John de.
Stockes, Robert and Thomas del. Sikes, William del.
Turnagh, Adam and John de.
Toune, Peter del [now Townhouse].
Wolstenholme, John de.
Wordhill, Thomas, Richard and Henry de.
Windybanks, Henry de. Whitworth, Robert and Dande de.
Whitacre, William de. Wordeworth [Wardleworth ?] Adam de.
Wode, Peter del.

DESCRIPTIVE NAMES.

William le Wilde
Nicholas the Clerk
William and Thomas, the Mercers
John and Nicholas, the Smiths
Henry the Hayward
Henry the Dyer [Lister]
William the Suker [Sutor]
William the Turnewright
Richard of the Mill
Nicholas the Cobbler
Hugh and Richard, the Millers
Alexander and Richard, the Hirdmen
Richard the Spencer.

[1] Mosiley was in Chadwick. It is named in a charter dated 1274.

Distinct Surnames.

Ander, Nell
Anisknave, William
Birhare, William
Cissore, William, Thomas, and Henry
Colle, Agnes
Dandes[1] or Richard and William
Fox, William and Matilda
Huddson, Henry
Jackson, Robert (de Stubilay)
Jepson, Richard and Robert
Maikinson, Edan
Nickson, Nicholas (of Heghlegh)
Omy, William
Patrick, Henry
Pilling, William
Stotte or Stottes, William
Sutor, Robert
Tyrry, Henry
Telleson, Richard
Windibunk, Margola, Wegge, and William

Christian Names only.

William the son of Richard
Margota the daughter of Henry
Geppus the son of Michael
Richard the son of Geoffrey
William the son of Perkyns
Thomas the son of Henry

From this classification we find that 57 places[2] furnished the second names of 102 persons; 18 people were described by their trades; there were 28 cases of undoubted surnames, and 6 persons were designated by Christian names only. Of the 57 places, 48 are all in the parish of Rochdale; 6 refer to places quite near to the parish or within the county, viz.: Crawshagh and Holden, in Haslingden; Horwicke near Bolton; Radcliffe near Bury; Kirkdale near Liverpool, and Newham is probably intended for Newsham near Preston; Henry de Burton may have come from any of the forty places known by that name, and the two solitary foreign names remaining are Paris—there being an Adam and Margota de Paris—and Byron. Paris was not a new name here, as in the twelfth century an assart in Spotland was known as

[1] The son of Dande, which was a common local Christian name.

[2] This includes Oxsilegh, which is doubtless of local origin, though no place is now known by that name.

"Parysrod." It may be noticed that to the majority of the places named the simple preposition "of" is prefixed, thus: John of Brodilegh, William de Whitacre; whilst in a few cases the words "of the" are used, as for example: Richard of the Dene, Dande of the Greve, John of the Hall, William of the Scholefield, and Peter of the Wood. The Dean referred to was Todmorden. It may be taken for granted that when a man was described as "of the" Scholefield or "of the" Wood, he was probably the owner or occupier of the entire place indicated, whereas Adam de Butterworth was only one out of several living in the extensive area known by that name. And it is at once apparent that to assume (as has often been done) that all the persons described as of a particular locality were members of one family is utterly unwarrantable, and as these place names at this period were in very few instances adopted as patronymics, a man might be John of Castleton for a time and afterwards John of Spotland or of Healey. Another difficulty that meets the genealogist who ventures into these early periods is that often, when the head of a family held lands which had given the name to him and his ancestors, it did not necessarily follow that his sons adopted the same name. An example of this is afforded in the history of Oakenrod. In 1238 this "assart" or clearing belonged to Adam de Castleton, twenty years afterwards it passed into other hands, and in 1250 it was owned by Alexander del Okenrod, who is described as the son of Robert de Spotland.[1] In the case of younger sons they would almost invariably get the name of the lands which they inherited or purchased.

As time passed on and the use of surnames became more common, the owner of estates gradually assumed the distinctive title of their properties as their family name, and John de Heley would become John Heley, thus reversing the Psalmist's words: "They call their lands after their own names." This assumption of family names was, however, a very slow process, and in the meantime there might, in large townships such as Butterworth,

[1] Coucher Book of Whalley, p. 762.

have arisen many families in no way related to the leading one, which would all ultimately become Butterworths.

There are very many places in Rochdale, besides those in the lists quoted, which in earlier times furnished names for the settlers therein. In the twelfth century there was an Alexander de Castelton, whose son Andrew a little later gave his land there to the Abbot of Stanlawe. Adam de Spotland and Robert de Spotland about the same period made similar grants to the Monastery, and as the name does not subsequently appear it may be presumed that they all died without issue, or that their children took other names. The Chadwicks furnish another example. In the twelfth and thirteenth centuries the whole of the hamlet of Chadwick passed to the Monks of Stanlawe, and for about a century afterwards we do not find any record of a person described as "of Chadwick." This may easily be accounted for if we suppose that the Monastery farmed its own land, or delegated the Vicar of Rochdale for the time being to do so for them.

Rochdale itself does not appear to have been used as a personal distinction. In early times, there certainly was not a family of that name, although much nonsense has been written about the "de Rochdale arms," &c. The large division of Rochdale known as Hundersfield in the thirteenth century, gave its name to a Michael de Hunrisfield, and early in the fourteenth century there was living here an Elias de Hunresfeld, but Hundersfield never appears to have become a recognised family name.

Many other examples might be quoted to show that, whilst the place itself is still called by its old name, the family originally called after it disappeared long before surnames became fixed. In the 4th Ric. II. (1380-81), a poll tax of three groats was levied on every male (except the clergy) and female, married or single, who was over fifteen years of age. In the parish of Rochdale 146 paid this shilling, and their names have been preserved. This roll therefore contains a list of all the inhabitants over fifteen years old, except a few of the very poor who certainly had no surnames. A digest of this Subsidy Roll yields the following facts bearing on the subject of this paper.

PLACE NAMES WITH THE PREFIX *de* OR *del*.

Byrkyl (2)[1]	Grene (1)	Stanrigges (1)
Buckley (2)	Holden (1)	Sale (1)
Belfelt (2)	Howarth (5)	Schofelt (2)
Botreworth (4)	Hamer (1)	Shor (1)
Clegg (3)	Hill [or Hull ?] (2)	Sykes (1)
Crawschagh (1)	Milnehouse (1)	Trual (1)
Chadwick (2)	Neubolt (1)	Wolstinholme (1)
Crompton (2)	Rockcliffe (1)	
Derden (1)	Stock (1)	

DESCRIPTIVE NAMES.

The Coke [*i. e.*, Cook] (1)	The Clerk (1)	The Lister (2)
The Coup (1)	The Fisher (1)	The Tailor (1)
	The Hayward (1)	Of the Mill (1)

DISTINCT SURNAMES.

(Each of these only occur once.)

Schewynd	Nichoul	Badde
Fauside	Kaysoun	Milictman
Hanson	Wordol	Schofelt
Mansell	Buckley	

CHRISTIAN NAMES ONLY.

Of these there are only six examples. There were therefore 41 inhabitants designated by the names of the places where they lived, 13 by their trades, 11 had distinct surnames, and 6 used Christian names only. One marked difference between these figures and those adduced for the names in 1332-36 is in the reduction of the number of places named. Of the strictly local names, the following have disappeared in the half-century which elapsed between the two records, viz.: Brodelegh, Birdeshall, Bothe, Castleton, Clogh, D'ernlegh, Dene, Foxholes, Heghlegh or Heley, Kirkeshagh, Okinrode, Romsden, Slaveden, Turnagh, Toune, Windybanks, Whitworth, Whitacre. Some of these names

[1] The figures denote the number of times the names occur (exclusive of the wives of the persons indicated).

as personal names do not turn up again subsequently. The non-appearance in this latter subsidy of some local names which were in the earlier one is difficult to account for, as they re-appear before the close of the century. On the other hand several new place names appear, amongst them Hamer, Newbolt, and Chadwick. Hamer now occurs for the first time, but people were described as of Chadwick and of Newbolt nearly two hundred years earlier, although it is extremely unlikely that between the De Chadwicks or the De Newbolts of the twelfth century and those of the fourteenth century there was the slightest consanguinity.

The Hamers, of course, took their name from the mere or small lake formed by the waters of the Hey-brook. The fact that we have on the same Subsidy Roll a Thomas Schofelt and a John de Scholfelt, a Geoffrey de Buckley and a John Buckley, clearly indicate that the assumption of family names was in a transition state in the district. Amongst the trade names must be noted the Coup, the old form of Cope is the chapman or small merchant; the Lister, or dyer; and the Haywards, or cattle-keepers, of which there were five. The whole list gives a fair representative of an early thinly-populated, wide-spreading parish, with its gentry, yeomen, and husbandmen, its dyer, chapman, tailor, and fisherman—for there were plenty of fish in Rochdale in those days. But as yet we have no signs of weavers, websters, or webbs, which mark the advent of a coming trade; the wool grown on the hills around was simply made into homespun cloth, for which no foreign market was sought.

In 1523, all who had lands or goods worth taxing were laid under tribute to meet the expenses of the war with France. In Rochdale 53 contributed; all of them had regular surnames, the "de" in every case having been given up. They consisted of one of each of the following, viz.: Buckley, Belfeld, Entwissel, Fylden, Fletcher, Gartside, Grenerawde, Hamer, Hoppewoode, Laurte, Lightoller, Newall, Nelson, Radcliffe, Schorwe, Schepperd, Smyth, Tailor, Thompson, Whitehead, Warburton, and Walsden: the names occurring twice were Brerely, Clegg, Milnes, Kyrshawe,

Hill, Schofield, and Wolstenholme; of Howarth there were three; and of Chadwicks and Holtes there were four.

In this list are several names to be noted as now first appearing, viz.: Entwissell, Brereley, Fylden or Fielden, Grenerawde, and Laurte, (the two last representing the modern Grindrods and Lords,) and the Newalls. Gartside and Lightoller furnish examples of old names revived; both are place names, and frequently used to describe their respective owner or inhabitants in the thirteenth century. The family name of Lord is undoubtedly a Lancashire name—probably a Rochdale one—and the question might be raised as to whether its original form was Laurte or Lord, the small stream still known as Lortburne rather suggests the former.

The Subsidy Roll of 1541 only supplies one new name—that of Hallywell.

The Court Rolls of 1566-7 give the following first arrivals in the parish, viz.: Hobson, Hollowes, Lee, Gorill, Lomax, Cheetham, Ogden, Layche [or Leach ?], Haslam, Casson, and Pickehomer.

Passing over another forty years we arrive at the period when our Parish Registers begin, and these furnish most accurate and reliable information as to our local surnames. From 1582 to the present day the Registers of the Rochdale Parish are complete, except that possibly some of the earlier baptisms and burials for the chapelry of Todmorden are wanting.

At this time the woollen trade was well established in the county, and a trade in "coatings" and other woollen goods was carried on in Rochdale, which was quickly followed by the manufacture of the same goods, which called forth a number of industries beforetime unknown in the parish; thus we find William Hallowes and John Ashworth carrying on the trade of cutlers, and they probably both came to Rochdale to develop that industry.

It has already been stated that in 1523 only 53 inhabitants of the entire parish were taxed on their land or goods for the war with France; for the Lay Subsidy in 1541 less than half that number contributed, but the total sum raised was considerably more. Comparing these figures with the number of baptisms,

marriages, and burials in 1584 leads one to the conclusion that either very few of the inhabitants held lands or goods of value enough to attract the notice of the assessors, or that the population was very materially increased between 1541 and 1584.

In 1584 there were at the parish church 149 christenings, 146 burials, and 35 weddings, and for thirty years the increase was rapid; in 1621 the christenings were 277, burials 208, and weddings 54. The population in the early part of the seventeenth century would be about 8,000, and the Parish Registers between 1583 and 1616 yield no less than 500 surnames, which, if equally divided amongst the inhabitants would give one surname to every twenty; but of course they were by no means equally distributed, and for the aggregate number there are several deductions to be made, such as names of strangers buried here, and the names of the non-resident men who saw the daughters of Rochdale that they were fair, took them for wives, and departed to their own parishes. But when every possible allowance is made the difference between the 31 surnames which made up the 52 tax-payers in 1523 and 500 surnames recorded sixty years later is a startling fact in the history of the nomenclature of the district. Amongst the 500 surnames there are no less than 230 (nearly one-half) which do not occur more than twice in the Registers between 1583 and 1616, and in many instances they did not subsequently appear. Of these names the following are examples: Abbatson, Ambler (Curate of Whitworth), Aspinall, Banister, Bath (the Vicar), Bearstall, Beighnett, Bell, Bentley, Binns, Bird, Bottomley, Bowell, Britland, Brogden, Bruxum, Bunder, Cawen, Chamwell, Coocrofte, Dowens, Duckworth, Dune, Fether, Flameninge, Green, Hadwa, Hale, Harbar, Handley, Hardre, Hawkesworth, Henthorne, Herdley, Homkerd, Horsfall, Howse, Hurste, Hudd, Jawall, Lawton, Linthwitt, Marchaulton, Ormerod, Pates, Ragge, Roydes, Shenburne, Thurnelewynde, Warmbie, and Wortley. Although one or two of these names have an unfamiliar sound with them, they are all, or very nearly so, good old English names: Flameninge sounds foreign, but it was only the clerk's

way of spelling Fleming, which was at this time a common name in Westmoreland, the christian names of James and Jane being attached to it prove it to be native. Thurnelewynd is described as of Eccles; he was married here.

Amongst the family names which have not previously been noticed, but which from their more frequent appearance in the Registers were clearly settled in the parish, are Ainsworth, Allen, Atkinson, Bardsley, Barlow, Baxter, Beswick, Birch, Bolton, Booth, Bradley, Broadbent, Brook, Bury, Byrom, Cheetham, Clough, Collinge, Cowper, Crabtree, Crompton, Cropper, Cross, Cryer, Deurden, Dewhirste, Dickson, Diggles, Dodson, Douson (Dawson), Driver, Earnshaw, Eastwood, Farrer, Fenton, Fish, Fitton, Fletcher, Frankland, Frith, Gleadhill, Goreld, Greenhalgh, Greenwood, Gryme, Haslam, Hilton, Holland, Hallowes or Hollas, Holme, Holroyd, Hoyle, Ingham, Jones, Kay, Kenion, Lamb, Leach, Lee, Lees, Livesay, Lyney, Maden, Marcroft, Matthew, Maud, Meadowcroft, Miller, Mercer, Midgley, Nuttall, Pickup, Pilkington, Potter, Pitts, Redfearne, Roades [Rodes], Ramsbottom, Sale, Scholes, Seddon, Sharpe, Shacklock, Shaw, Smethurst, Stanneringe, Stock, Strangfellow, Street, Strenger, Sutcliffe, Swallow, Tattersall, Tetlow, Tomlinson, Utley, Walch, Walkden, Ward, Wardle, Wardleworth, Watson, Whatmough, Whytley, Wilkinson, Wolfenden, Worall, and Wrigley.

In many places the advent of the cloth trade was marked by the introduction of such names as Walker, Tucker, Comber, Webster, Webb, and Dyer, but in Rochdale at this period none of these were at all common. The following table has been compiled for the index to the printed volume of Parish Registers from 1582 to 1615, and is intended to show at a glance the relative number of people bearing the old Rochdale surnames then living in the parish.

Forty-Seven Surnames in Registers 1582—1616,

WHICH MOST FREQUENTLY OCCUR.

Name.	No. of times which it occurs.	Christian Name most frequently used.	No. of times this Christian name occurs
Ashton or Asheton	42	John	9
Ashworth	130	John	32
Belfield	164	George	15
Brereley	492	James	59
Buckley	294	Robert	37
Butterworth	874	John	114
Casson	68	Francis	11
Chadwick	652	John	100
Clegg	490	James	65
Crossley	140	John	34
Deurden	160	James	29
Fielden	190	John	42
Gartside	56	Gabriel	6
Goreld	46	Robert	18
Hallowes	400	John	44
Hamer	244	James	32
Hardman	135	Laurence	22
Haslam	130	Elias	19
Haworth	235	John	36
Healey	133	John	18
Heyward	166	James	30
Hill	297	James	54
Holt	747	Robert	66
Hopwood	150	John	28
Kershaw	495	James	65
Leach or Laych	185	James	25
Lees or Leize	63	James	10

SURNAMES IN REGISTERS.—*Continued.*

Name.	No. of times which it occurs.	Christian Name most frequently used.	No. of times this Christian name occurs
Leigh	150	Edmund	20
Lord	236	Edmund	23
Milne	582	James	92
Milnes	38	James	11
Ogden	213	Edmund	34
Rhodes or Rodes	122	John	23
Scholfelde	770	James	76
Shore	190	Thomas	38
Smith	276	James	53
Stock	123	John	25
Stott	285	James	64
Taylor	610	James	73
Turnough	280	James	53
Wardle	110	James	30
Whitehead	168	Thomas	31
Whittaker	195	John	29
Whitworth	350	James	39
Wolfenden	284	James	52
Wolstenholme	79	John	18
Wylde	215	Thomas	28

It is clear from this list that the most common surnames in Rochdale at this date were Butterworth, Scholfeld, Holt, Chadwick, Taylor, Milne, Brereley, Kershaw, Clegg, Hallowes, and Whitworth, and that by far the most frequently occurring were Butterworth. Of these 47 names, 27 are beyond doubt derived from local places, viz.: Ashton, Ashworth, Belfield, Buckley, Butterworth, Chadwick, Clegg, Crossley, Gartside, Haworth, Healey, Heywood, Holt, Hopwood, Kershaw, Leigh, Milne, Ogden, Rhodes, Scholfeld, Shore, Turnough, Wardle, Whitworth,

Whittaker, Woolfenden, and Wolstenholme. In the case of Kershaw, although the exact locality cannot now be identified, it was somewhere near Townhouse, in Hundersfield, as here in the thirteenth century lived John de Kyrkshagh and his descendants, and in the fifteenth century we find the name as Kyrshagh. The Brereley family first appear in 1523, when there were a James Brereley sen. and jun. taxed; a century later we find a farm in Hollingworth called Bryerlye. The township of Brierley, near Barnsley, may possibly have furnished this family name. John Casson was one of the Manor Court Jury in 1567, and twenty-five years afterwards quite a colony of that family was settled here. The Duerdens or Deardens came to Rochdale about the end of the sixteenth century; there was a James Deurden, a husbandman of Stoney Heys, in Wardleworth, living in 1579.[1] The family is said to have originally been located at Accrington; wherever they came from they appear to have migrated in considerable numbers. The Fieldens or Fieldings are believed to have come from Nottinghamshire; in 1532, Robert Goreld was a witness to the articles of agreement for the foundation of Whitworth Chapel; Hallowes or Hollas has already been referred to as a cutler in the sixteenth century,—they may have come from Sheffield, the then centre of the knife trade. At least two of the name were here in 1566. Stott is not peculiar to this district, though it appeared here as a surname in the fourteenth century;[2] it disappeared again Haslam is a Bolton name, and is not uncommon in Derbyshire and Nottinghamshire.

About the middle of the seventeenth century, or a little earlier, there were several new names introduced which are worth a passing note, although some of them soon disappeared: Ackroyd, Arret or Horud, Beighton, Birtstall, Byckerdyke, Carrington, Crabtree, Dawson, Harbert, Heape, Midgley, Moore, Pickup,

[1] There was a Maria de Derden's name in Subsidy, 1380-81, but the name does not subsequently occur.

[2] It is common in Northumberland, Somersetshire, and Yorkshire; it is an old English word for a horse.

Pilling, Royds, Siddall, Sogener or Soioner, Strangefellowe, and Stringer.

What is generally known as "the Protestation," taken in 1641, furnishes a complete list of the then inhabitants of the entire parish. By an order of Parliament, dated 21st January, 1641-2, the male inhabitants of every parish who were eighteen years old and upwards were to have tendered to them "the Protestation," and their name to be then and there taken down as "protesting" or "non-protesting." In Rochdale, as there were no Roman Catholics everyone took "the Protestation." The numbers in the four great divisions of the parish were: Castleton 401, Hundersfield 738, Butterworth 370, Spotland 570, making a total of 2,079, to which has to be added a few officials, and thus making a grand total of 2,100. This list shows that there were only then in Rochdale a little over 300 surnames, whilst thirty years before there were over 500 (including people married here). This wants accounting for. There can be little doubt but that the primary cause was the plague (the sweating fever), which visited Rochdale in 1623,—between the 1st July and the end of February nearly 500 persons were buried in the old churchyard. This heavy mortality must have had the effect of frightening away many of the families recently settled in the district,—and if further proof of this were required, it is furnished by the diminished death rate in the years immediately following. For several years before 1623 the burials at the church had averaged 200, but in 1624 they fell to 150, and it was nearly twenty years before they again reached the higher figure. Referring again to "the Protestation," out of the 2,100 there enumerated we find that the eleven surnames just referred to are still at the head of this list, and it is rather curious how some of them cling to the particular district from which the name sprung.

Name.	Township.				Total.
	Castleton.	Hundersfield	Butterworth.	Spotland.	
Butterworth	12	27	40	19	98
Scholfeld	29	24	16	20	89
Holt	21	18	4	29	72
Chadwick	10	12	15	26	63
Taylor	21	5	12	14	52
Milne	14	14	42	14	84
Brereley	10	14	26	4	54
Kershaw	—	36	18	—	54
Clegg	11	15	10	25	61
Hallowes or Hollas	4	9	—	11	24
Whitworth	20	5	5	7	37
					688

These eleven names amount to 688, or one-third of the entire population. The Butterworths were nearly 100, so that, roughly speaking, out of every twenty men one was called by that name; it was scattered all over the place, but the hamlet of Butterworth contained nearly one-half of this extensive family. The Scholfelds, Chadwicks, and Taylers were found in all the townships in nearly equal numbers; the Kershaws were confined to Hundersfield and Butterworth; and the Milnes were for the most part living in Butterworth, probably in Milnrow,—the name of which place and the surname Milne having a common origin. It would be interesting to know what status the various families who comprised this large portion of the inhabitants held, but the material is not in existence to supply such information. Some little clue may be found in the number of wills[1] under each name proved at Chester between 1621 and 1650: Butterworth 22, Chadwick 22, Scholfeld 13, Holt 15, Clegg 12, Milne 10, Brereley 8, Taylor 7,

[1] Includes letters of administration where there was no will.

Kershaw 4, Hallowes and Whitworth 1 each. From this it is at once apparent that a very large proportion of the bearers of these names were not rich in this world's goods, as they neither made wills nor did their descendants take out letters of administration. A question may well arise as to why the surname of Butterworth was so much more common than any other in the parish, and has continued to be a very common local name up to the present day. For this several reasons may be adduced. One is that the township of Butterworth did not lie immediately adjacent to the old town of Rochdale, and its inhabitants being scattered and chiefly employed in husbandry they would continue for a longer period to be described as John or Thomas of Butterworth, and ultimately all be called Butterworth as a surname. Another cause for the increase in later times of these district local names is probably due to the custom, which obtained all over the kingdom, of calling foundlings and other nameless waifs and strays after the township in which they were found; thus the Temple Registers (London) show that in that district alone, between 1728 and 1755, no less than 104 foundlings were christened, all of whom were surnamed Temple or Templer. In the second year of George III. (1761-2) an Act was passed specially directing that children received in a workhouse were, in cases where their names were unknown, to have surnames given them by the overseers and churchwardens.[1] Is it not possible that some such custom as this may have given rise to the once common local phrase: "We're o' Johnny Butteroth lads." This saying was often quoted by Edwin Waugh, and before his death I received from him the following letter:

The Hollins, New Brighton,
17th November, 1890.

My dear Colonel Fishwick,

The idiomatic phrase "we're o' Johnny Butteroth lads" was well known in my young days amongst the country folk of Lancashire,—I mean chiefly those dwelling outside populous towns—and was used in the sense of our being all akin, all "of one flesh and blood," "who made of one flesh and blood all the dwellers upon earth." Country folk up in Wardle Fold used to say, "But

[1] Burns' *Hist. of Parish Registers*, p. 80.

E.

what's use o' fratchin'? Aren't we o' Johnny Butteroth lads?" In this sense I have used it in one of my songs, called "Let's forgive one another,"—

"Some liken to wrangle o'er nought but a name,
An' who were their mams an' their dads,
But gentle or simple it ends up the same—
We're o' Johnny Butteroth lads!"

At the foot of the song I give the following note in explanation of the phrase: "'We're o' Johnny Butteroth lads!'—a common saying in Lancashire, meaning that we are all God Almighty's children."

I am not very well, but I am, nevertheless,

Yours very truly,

EDWIN WAUGH.

During the eighteenth century many of the older names still held their places as the most common surnames in the parish, but their percentage of the total surnames in use gradually grew less. In 1783, the town of Rochdale was still only small, there only being 200 houses on the whole of the Glebe estate; but with the birth of the present century its rapid development began, new industries and trades were established, and with them came fresh names from all parts of the country, and though the Butterworths, Schofields, Holts, Chadwicks, and others are still numerous they do not predominate as they once did. A moment's study of the map of Rochdale will show that there are a considerable number of farmhouses which have taken their names from the original owners or occupiers; for example, Beightons, Hudsons, Grimes, Goreld's, Hartley, Hollows (or Hallowes), Birches, Marcrofte Gate, Passmans, etc. These are all called after people living in the last century or late in the century preceding, but in no instance did they furnish surnames. Before concluding, we must not overlook the fact that in some outlying parts of the parish the use of nicknames has scarcely yet died out. Such words as are used in Edwin Waugh's "Besom Ben," if they are not real are at all events very good imitations: for example, "Twitchet," "Riprap," "Jem at Tobe's Yed," "Mall o' Flazers," "Lump Yed," "Jem o' Thrutcher's," and "Ab o' Pinders" are evidently akin to such names as the following, where the persons designated have not

been dead a score of years—indeed, some of them are still alive: "Charlie o' Aseters," "Red Shilling," "Jack o' Great Harry's," "Jim o'er all," "Swanker," "Johnny o' Bull Johnny's," "Ned S'enacre," "Jone o' Sheriff's," "Maltoot," "Johnny Baa-Lamb," and a host of others which might be named. In many of these cases it is no exaggeration to say that the real surname was not only not used, but in some instances almost forgotten.

At the present time there are not lesss than 1,500 surnames in use in the parish, the great bulk of which are in no sense local names, but have come from all parts of the kingdom; and there is no doubt but that, in a few years, the population of our large towns will be of such a mixed character that the old local surnames will cease to hold anything like the prominent position which they have so long held. But let us hope that the day is long distant when the surnames which have designated the people of Rochdale for so many centuries shall cease to flourish in their native soil, and, in the meantime, by whatever names we may be called let us accept the sentiment of our local poet, and say—

"We're o' Johnny Butter'oth Lads."

APR 22 1959
GENEALOGICAL SOCIETY
OF THE CHURCH OF JESUS CHRIST
OF LATTER-DAY SAINTS

59062

SOME OF THE RECENT RESULTS OF THE INVESTIGATIONS INTO LOCAL ERRATIC BLOCKS.

By S. S. PLATT, Assoc. Mem. Inst. C.E. Read 12th Feb., 1892.

IN 1873, a Committee of the British Association commenced to report on the "Position, height above the sea, lithological characters, size and origin of the Erratic Blocks of England, Wales, and Ireland, and on other matters of interest connected with them, and taking measures for their preservation." These reports have continued annually up to the present time, and constitute a voluminous record of such blocks in various localities, but, with the exception of the records of our members, Mr. Watts, F.G.S., of Piethorn, and Mr. J. Horsfall, of Healey, those referring to South-East Lancashire are very few.

In response to an urgent appeal by the British Association Committee a local Committee has been recently formed, at first known as the "North-West of England Boulder Committee," comprising representatives from Lancashire, Cheshire, Derbyshire, Staffordshire, Shropshire, the Isle of Man, etc., and since its formation much good work has been carried out. The name has now (1892) been altered to "The Glacialists' Association," and the scope of its work considerably extended.

The Rochdale Literary and Scientific Society is also one of the corresponding societies of the British Association, to assist in furthering its objects and in collecting information, and it is therefore peculiarly fitted to render assistance in "defining the area of distribution of such erratic blocks on the western slopes of the Pennine chain," as this is a specially interesting feature of the question.

The author was therefore pleased to join the North-Western Boulder Committee in this work, and it will be of interest to the members of this Society to know that the report of your representative was one of the fullest in the Nineteenth Report of the British

Association Committee (1891), a copy of which can be seen in the Free Library. The author described, by the aid of diagrams, the origin and meaning of these erratic blocks, but as it would occupy too much space of this volume he would briefly state that they are travelled stones or boulders scattered all over the north and centre of England, and that they belong in many cases to rocks which could not be found in the neighbourhood; that they have been transported by the agency of ice, but whether of land ice or floating icebergs geologists are not yet agreed, but the examination and recording of the various phenomena connected with this subject will, it is hoped, ultimately render the question easier of solution. Readers are referred to the following for information on this part of the subject:

"Manchester Science Lectures," Second Series, 1870-1, page 101, etc.
Ditto—Fourth Series, 1872-3, page 20, etc.
Kingsley's "Town Geology," page 36, etc.
Any good geological text book, *e.g.*, Geikie, Page, Lyell, &c.

All of the above can be consulted at the Free Library.

Occasionally when the drift deposits of this neighbourhood are removed for the purpose of baring the rock, *e. g.*, at the flag quarries near Facit, Bacup, or Rawtenstall, it is noticed that the surface of the rock bared is polished and scored or "striated" in lines which almost invariably have one definite direction, viz.: N.W. to S.E., or N.N.W. to S.S.E. This is the direction which it is supposed the ice took in its course from the glacier-fields of South-West Scotland and the Lake District over this neighbourhood (see small map shewing the direction of the dispersion of the erratic blocks).

The author has added at the end of this paper an outline map of this neighbourhood, showing by different signs thereon the position and varieties of rocks recorded up to the present. For further detail he would refer the reader to the Eighteenth (1890), Nineteenth (1891), and Twentieth (1892) Reports of the British Association Committee, which can be seen at the Free Library.

He would, however, draw attention to a few special features of the dispersion noted.

At Norman Road, Sparth Bottoms, Rochdale, there is a complete admixture of granites from South-West Scotland, from the neighbourhood of Dalbeattie, Creetown, Criffel, etc.; several varieties of granites and volcanic rocks, silurian grits, etc., from the Lake District; hematite from the Furness District; quartzite pebbles, probably from the Bunter Beds, near Carlisle; carboniferous limestone from the neighbourhood of Carnforth; local grits from the north and north-west of Rochdale. Most of the specimens can be defined and localised.

The same also are to be found at a brickyard at Castleton, and at another at Hopwood.

In all these places the stones are found embedded in the stiff "boulder" clay (hence the name), and are scattered indiscriminately in it, and apparently without any stratification. Many of them, especially the carboniferous limestones, volcanic rocks, and silurian grits, shew marks of striation sometimes in the direction of their longest axis, which would be in the line of least resistance whilst under the ice, but more frequently the striations are intercrossed in every direction, which would indicate that the stones sometimes moved their places a little under the ice, and also that, whilst the stones under the ice could scratch the natural rock in their passage over it, they themselves could be scratched by other stones embedded in the ice.

At several high points in this neighbourhood a considerable number of boulders are found which would suggest the deposit there of "moraine matter," *e. g.*, at Hill Top, south of Hartley; Stoneyfield; Hebers between Heywood and Middleton; Nicholas Pike above Hollingworth Lake; and in the road near Doldrum, &c., south of Nicholas Pike; the elevations of which are marked on the map attached hereto. Large isolated boulders are also to be found on Nicholas Pike; in the Facit Cemetery (near the chapels); near the Spring Mill and Cowm Reservoirs of the Rochdale Waterworks; and in the Naden Valley near the Heywood Waterworks Reservoirs; but one of the largest as yet found in

this neighbourhood is at Cown Top, near Castleton, of which the following is the description :

"The stone when first discovered lay on the slope of the hill, but almost out of sight, part of the top only being visible, level with the surface, but on having it excavated it was found to measure 5ft. 9in. long by 5ft. 3in. wide by 4ft. 3in. deep, and to have an approximate weight of ten tons. The top was somewhat irregular, but on being turned over the underside of the boulder was found to be so polished, flattened, and rounded that it affords clear evidence that its transportation from its place of origin must have been by means of ice. The boulder is very similar in composition and character to the one found over three years ago in Oxford Street, Manchester, and which was subsequently removed to the quadrangle of Owen's College. The rock of which it is composed is andesite with epidote, and the probable source of this boulder is Coniston or Borrowdale Valley, Lake District. It was embedded in sand, but, from a careful examination, it is believed to have been originally deposited in boulder clay, and that its present situation is due to its having been disturbed by denuding agency, and that it has probably rolled from one of the adjoining hill tops."—(AUTHOR.)

A photograph was taken of it before being disturbed, a copy of which has been presented to the Free Library for reference. An endeavour was made to obtain the transfer of this block to the Rochdale Public Park, but permission was refused. There are two fine specimens in the Oldham Public Park, and recently a very interesting one of five tons weight has been transferred to the Middleton Park. There is a large "local stone" erratic in the corner of the Rochdale Park, at the foot of the Slopes, which shews well-marked striations and polishing. This was found near to its present resting place, and was rescued from demolition by Mr. Alderman Taylor.

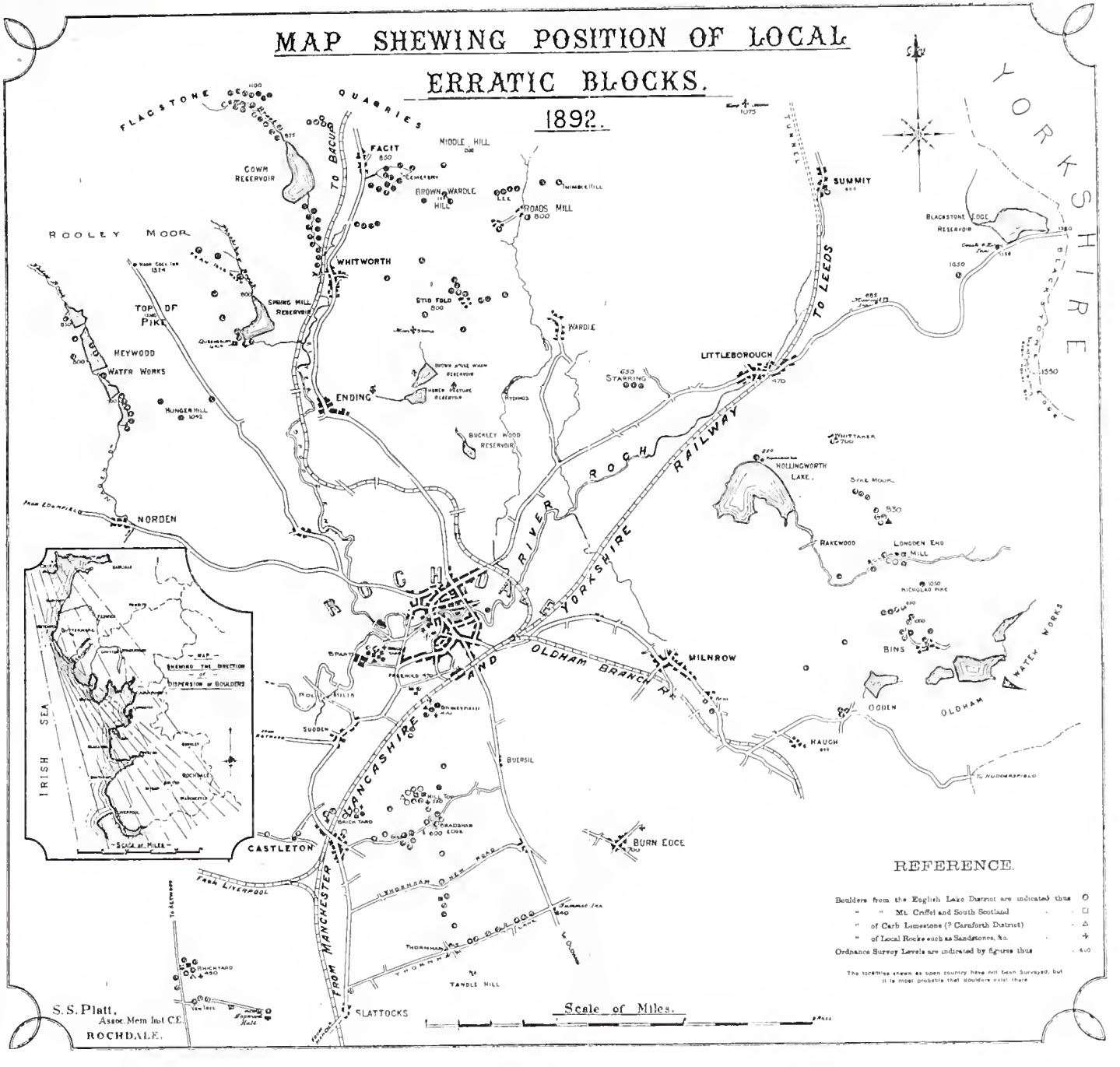
The following table will shew the number and proportionate varieties of the rocks recorded by the author up to the date of printing this paper.

Granites from S. W. of Scotland, viz.: Criffel, Creetown, Dalbeattie, New Galloway, &c.	26
Haggis Rock; Queensberry Grits, near Beattock, Dumfriesshire	1
Dark coloured Volcanic Rocks from the Lake District, principally from the neighbourhood of Coniston and Borrowdale, such as Andesite, Volcanic Ash, Volcanic Breccia, Dolerité, &c.	91
Rhyolite and Hälleflinta, Lake District	25
Granite from Eskdale, Lake District	27
Syenite from Buttermere and Ennerdale, Lake District	63
Syenite (Lake District ?)	18
Quartz Felsite and Quartz Porphyry, Lake District	20
Skiddaw Granite, Lake District	1
Altered Slate, Lake District	1
Hematite (Furness District ?)	2
Quartz and Quartzite	9
Silurian Grit	6
Carboniferous Limestone (Carnforth District ?) (Many small boulders of this also seen but not noted.)	6
Local Grits, Sandstone, Flagrock, Cank, Gannister, &c.	26
Flint (N. E. of Ireland ?)	4
Syenite (locality of origin unknown at present)	8
Granite (locality of origin unknown at present)	7
Various (variety and locality not at present determined)	29
Total	370

The author exhibited specimens of the many varieties of rocks found as "erratics" in this neighbourhood, and also for comparison many of the parent rocks of same, and he would be prepared to hand over, whenever a local museum is *un fait accompli*, good characteristic specimens for the guidance of others who may in the future take an interest in the subject, for only those who have experienced it can imagine the difficulty of correctly localizing the boulders found from time to time. Until recently even the Owens College Museum did not possess any for comparison, and the author would ask all who see any large stones unearthed of this character to communicate with some one interested in this subject, as a great many are ruthlessly broken up or buried and their record to science possibly lost for ever.

MAP SHEWING POSITION OF LOCAL ERRATIC BLOCKS.

1892.



THE NEW STAR IN AURIGA.

Abstract of Lecture by the Ven. Archdeacon WILSON.

ON March 25th, 1892, the Vicar, Archdeacon Wilson, gave a lecture to the Society on the new star in Auriga. He gave a *résume* of the discoveries which have led to what may be called the newer or meteoritic astronomy, and expounded Lockyer's views as to the relations between meteoritic dust, and meteoritic and comet and nebula, and the stages of development through which the stars pass. The new theory throws some light on the perplexing question of the origin of new stars.

The new star in Auriga was seen towards the end of January of the present year by an amateur observer, Mr. Anderson, who had no other appliances than a small hand-telescope and a star map. It was then of the fifth magnitude. He reported its appearance to Mr. Copeland, of the Edinburgh Observatory, who verified the fact and telegraphed the news to all the principal observatories in the Northern Hemisphere. Hence, within a few days the new star was being examined with the spectroscope, etc., and its mysterious message photographed, night after night.

The Vicar had the invaluable assistance of Mr. W. D. Watson and his lantern, and had in the earlier part of his lecture shown some very beautiful slides sent him from the Lick Observatory in America, and from Cambridge, South Kensington, and elsewhere, to illustrate the general theory, and now he was able to throw on the screen the original photographs of the spectrum of Nova Aurigæ, as taken by Father Sidgreaves at Stonyhurst, and by Mr. Lockyer a day or two later, and also drawings made from a minute microscopic study of those photographs. The meaning of the bright and dark lines in the spectrum was then explained, and the principles of the reasoning were given by which the conclusion was arrived at that the new star arose from the collision, or rather

the interpenetration of two meteoritic clouds, one denser than the other, but neither of them a solid mass, moving with a relative velocity in the line of sight of nearly five hundred miles per second. It was further shewn what were some of the chemical elements in the meteorites. There were, however, as the Vicar pointed out, some phenomena in the spectra which were novel, and had received no satisfactory explanation, such as the thickening and the apparent division of some of the dark lines. It could not be said, at the time when the lecture was given, that any theory completely accounted for the observed facts.

The Vicar then spoke of the periodic stars, and gave some interesting reasoning by which it has been proved that, in one case at any rate, the periodicity is caused by the revolution of a dark body round a luminous primary; and how the actual size of the orbit, and the diameter of those stars, can be approximately ascertained; and with a few remarks on spectroscopic binaries the lecture concluded.

MAGIC KNOTS.

By H. C. MARCH, M.D., Lond. *Read 8th April, 1892.*

THE Accadians, those precursors of the Assyrians, and for long their masters in wisdom and prowess, were the originators of astronomical science. But the eagerness and success with which they studied the movements of the heavenly bodies depended less on their love of knowledge than on their love of power, for when they found themselves able, in this way, to predict events they hoped to be able also to control them.

But, as they could not comprehend the forces that surrounded them, they attributed to those mysterious energies a personality and a volition similar to their own, and in order to influence their action they became practitioners of all manner of magical arts. The malevolent tying of a knot brought mischief upon a man, to be averted only by counter-plotting and counter-knotting. Sickness was caused by the invasion of a demon, or by spells wrought by an enemy; and evil spirits had to be exorcised, and the knot of the spell-bound to be loosed.

The Magical Texts, found in a biliteral form, written in the Accadian and the Assyrian tongues, furnish the following examples:

> The white cloth, the cloth which is folded double,
> Bind both to the side and to the frame of his couch;
> The black cloth, the cloth which is folded double,
> Bind upon his left hand.
> May the evil demons never come upon him.

> Bind this man with wisps of straw,
> With wisps of straw which the wind has dried.

> Bind a wisp of straw round the man,
> Repeat the spell of Eridu.

> May the God of herbs
> Unloose the knot that has been knitted.

Take the skin of a suckling that is still ungrown,
Let the wise woman bind it to the right hand and double
it on the left;

Knit the knot seven times,
Bind the head of the sick man.

So may the guardian priest cause the ban to depart
From him, and unloose the bond.

Like this dyed thread which is torn and cast into the fire,
The burning flame shall consume it,
So may the ban depart and the bond be unloosed.

Beliefs and practices of this kind necessarily spread westward to Palestine, and we find some traces of them even in the Bible:

"And Samson said to Delilah, If they bind me with seven green withes that were never dried, then shall I become weak. . . . And he brake the withes as a string of tow is broken when it toucheth the fire. And he said, If thou weavest the seven locks of my head with the web. . . . And he awaked and went away with the pin of the beam and with the web" *(Judges xvi.)*.

"Bind thy father's commandments continually upon thine heart, and tie them about thy neck" *(Prov. vi.)*.

"Canst thou bind the sweet influences of the Pleiades, or loose the bands of Orion?" *(Job xxviii.)*.

M. Lenormand, the great Assyrian scholar, has shown that there is a close affinity between the Accadian and Finnic languages. The most striking part of the evidence is—1, analogous forms of plural and dual; 2, the absence of any distinction between the masculine and feminine genders; 3, a close resemblance of the pronouns; 4, the use of the same particle in forming the causative of verbs; 5, the existence of a negative conjunction unknown to any other family of languages; and 6, the use of postpositions where the Aryan and Semitic languages employ prepositions.

But if the Accadian speech could extend to the north of Europe, Accadian creeds could follow it, and we must be prepared

to meet with many proofs of magical practices both in the literature of the Fins and in the writings of their Teutonic neighbours.

In the Kalevala, the Epic of the Fins, we read of the "magic oak," and *the osier* is spoken of with reverence.

In many legends of the North, iron implements are associated with disaster, an echo, no doubt, of the consternation that seized neolithic peoples when their better-armed foes beset them. Wainamoinen, one of the heroes of the Kalevala, was wounded in the knee by an iron adze, and as the bleeding could not be staunched he sought the aid of a magician. This old man, having made a balm, rubbed the body of Wainamoinen, anointing the hero's wound in every part, and said: "I touch thee, not with my own flesh, but with the flesh of the Creator; I stroke thee, not with my own strength, but with the strength of the Omnipotent; I speak to thee, not with my own lips, but with the lips of Jumala. Yea, if my lips are pleasing, more pleasing still are those of Jumala; if my hand is soft, softer yet is that of the Creator."

Now, as soon as the balsam was poured upon the wound the head of Wainamoinen swam; he reeled like a drunken man, for his anguish was great. Then began the old man to conjure the pain. He prepared a stuff of silk, and cut it into strips to fasten the balsam upon the hero's knee. And he lifted up his voice and said: "May the silk of the Creator be for a bandage, may Jumala's cloth serve as a covering for this wounded knee. Bestow thy blessing upon the plaister, O divine Jumala; prosper it, O glorious Creator." All at once Wainamoinen felt himself marvellously relieved, and immediately his cure was complete. His wound was healed, and his flesh was firmer and more beautiful than ever before. Power was restored to his foot and suppleness to his knee, and there was no pain any more. Then, majestically raising his eyes to heaven, he exclaimed: "Mercy and succour come ever from on high, from the all-powerful Creator. Praise and glory be to thee, O Jumala, the only God, who hast been my sure protector amidst the anguish the iron has caused."

One of the oldest Norse writings is the *Háva Mál*, "the Word of the Most High," or Woden's Wisdom. Woden was the Father

of Spells, the Revealer of Secrets, the Reader of Mystic Runes. He declares: "I know songs such as never son of man knows. The first is one that will aid in all qualms and quests and sorrows. . . . A fourth I know: If my foeman lay bonds on my limbs I can chant myself free; the fetters fly off my feet, and the shackles from my hands. . . . A sixth I know: If a man wounds me by spells of the ras viđar [the rush-tree, or withy], the curse shall seize him that lays the spells, and not me."

In the *Song of the Runes*, under the letter B, we read: "The Birch has the greenest-leaved branches. Loki braided a coil of falsehood." Loki was the supreme mischief-maker in Norse Mythology.

We are able, then, to see, with sufficient distinctness, that evil spells could be wrought by malevolently twisting into a magic knot the fibres of certain trees, sometimes the birch, but more often the willow; and that to unloose the knot was the surest way of undoing the mischief.

In the Orkney Saga we are told how Earl Rögnvald and Sigmund Ongull went to Palestine and bathed in the Jordan; and how they swam across the river, and went to some brushwood *(hris kjörr)* and tied large knots. Then Sigmund sang:

"This day have I tied a knot
For the empty knave
Who stirs not from home;
We have done him a sure mischief."

Then sang the Earl:

"Tie we knots for this pitiful fellow,
Wrathful was I when I came to this pleasant spot,
Where the bushes grow so thick."

The Sigurd Saga tells a similar story. King Eystein and King Sigurd went one spring to the uplands, and they were both in the house of Eystein, when, in the evening, as the people began to drink, the ale was not good and the guests were sad and silent. Then, to raise their flagging spirits, Eystein began to banter and out-boast Sigurd, and, after some scornful interchange of speech,

the latter said: "It has been common talk that I made a noble expedition out of this land while thou sattest at home like thy father's daughter." Eystein rejoined: "I was doing better work in this kingdom. I set a warping post and an iron ring in the sound of Suiholm, and in Bergen I built a royal hall, whilst thou wast killing bluemen for the devil in Serkland." Sigurd continued: "On the way to Palestine I came to Apulia, but, brother, I did not see thee there. I went all the way to Jordan, and swam across the river. On the bank there grows a bush of willows, and there I twisted a knot of willows which is waiting there for thee. For this knot I said thou shouldst untie, brother, or take the curse that is bound up in it."

But spells could be bound in another fashion. We learn in the Njal Saga that Hrut was about to sail for Iceland. "Hast thou a wife out there?" asked Gunnhillda, who had fallen in love with him. "No!" was the reply. Afterwards she led him aside to talk alone, and said to him: "Here is a gold ring which I will give thee;" and with that she clasped it round his wrist. Then she put her hands about his neck and kissed him, and said: "If I have as much power over thee as I think, I lay this spell on thee that thou mayst never have any pleasure with that woman on whom thy heart is set in Iceland. And now it is like to go well with neither of us." Hrut laughed when he heard that, and went away. And in Iceland he married Unna, but she and Hrut did not pull well together as man and wife. And she went to her father and sang him a song in which she said that Hrut was not master of himself; that Hrut and she could not live together because he was spell-bound; and that she desired to leave him. And she rode away to the Thing, and at the Hill of Laws she proclaimed herself divorced.

It is pleasant to turn, in conclusion, from these gloomy and vindictive pursuits to the sweet practice that Shakespeare describes: "Why, then," says Lucetta, "your ladyship must cut your hair." "No, girl," replies Julia, "I'll knit it up in silken strings, With twenty odd-conceited true-love knots" *(Gent. Verona, II., 7)*.

"Necte tribus nodis ternos, Amarylli, colores;
Necte, Amarylli, modo; et Veneris, dic, vincula necto."—
Virgil, Ec. viii. 77.

The true-lovers' knot would seem to have been knit both of three bands and of three colours.

We are told that a love-sick maiden must sleep in another county, and knit her left garter round the garter and stocking of her right leg. Repeating the following spell, she must knit a knot at the end of each line:

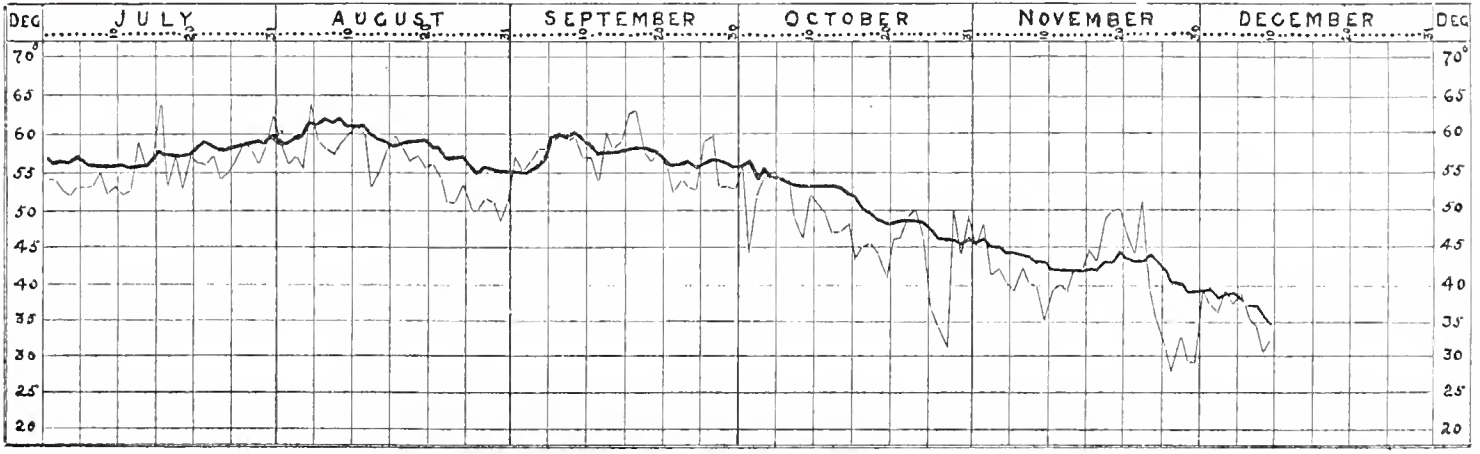
"This knot I knit,
To know the thing I know not yet,
That I may see
The man that shall my husband be,
How he goes and what he wears,
And what he does all days and years."

A variant of this method is given by Gay:

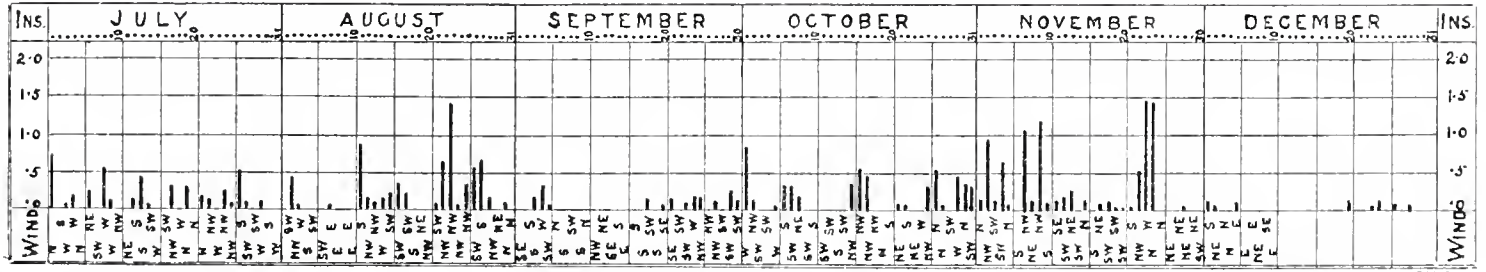
"A Lubberkin once slept beneath a tree,
I twitch'd his dangling garter from his knee,
He wist not when the hempen string I drew.
Now mine I quickly doff, of inkle blue,
Together fast I tie the garters twain,
And, whilst I knit the knot, repeat this strain:
Three times a true-love's knot I tie secure,
Firm be the knot, firm may his love endure."

TEMPERATURE OF AIR AND WATER AT COWM RESERVOIR (ROCHDALE WATERWORKS)

AIR ═══ —— —— 1890 —— WATER ═══ ——



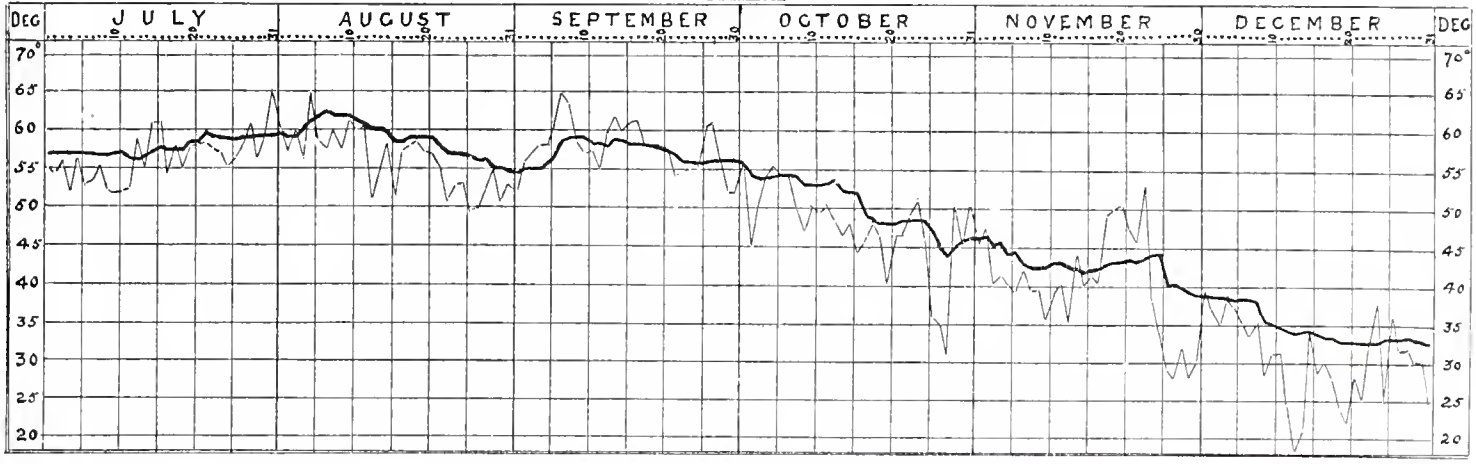
RAINFALL AND DIRECTION OF WIND



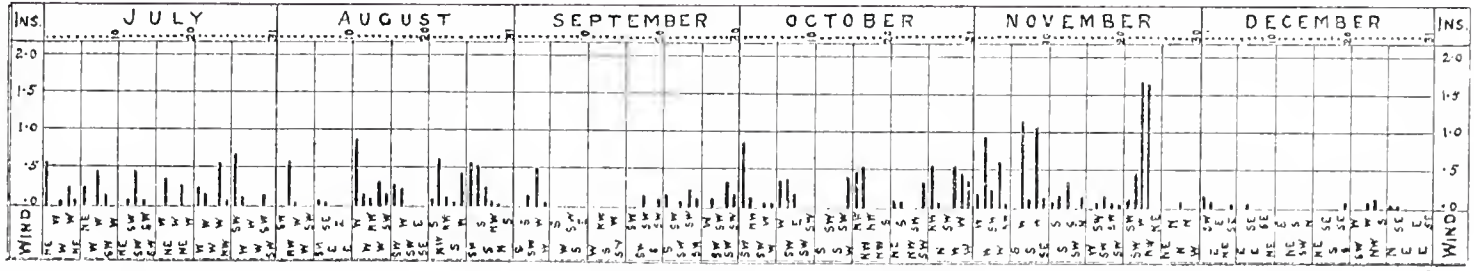
T.W.

TEMPERATURE OF AIR AND WATER AT SPRING MILL RESERVOIR (ROCHDALE WATERWORKS)

AIR ═══ ——— — 1890 — WATER ═══ — — —



RAINFALL AND DIRECTION OF WIND



T.W.

SEASONAL VARIATIONS OF TEMPERATURE AT SPRING MILL RESERVOIR.

By J. R. ASHWORTH. April 8th, 1892.

IN Volume II. of the Transactions of this Society, page 103, a brief account is given of an investigation into the seasonal variations of temperature of the Rochdale Reservoirs, with a tabular and graphic statement of the results, from January 1st to June 30th, 1890. It now remains to supplement what is there given with the observations recorded to the present date—June 30th, 1892. At the outset it should be stated that the interest and value of these observations cannot be estimated apart from the simultaneous and similar observations which have been carried on by other local societies and individual observers in different parts of the country, and for purposes of comparison, as well as for a complete survey of the investigation, the Final Reports of the Committee of the British Association dealing with this subject should be consulted.[1]

The results of a study of the curves of daily, and of weekly and monthly mean temperatures at Spring Mill, covering two-and-a-half years, are here briefly set down.

(1) The most prominent feature is the relation of the curves of air and water temperatures as they pass from minimum to maximum and from maximum to minimum. In the spring of the year, when the temperature is rising, the atmosphere is warmer than the water; but in the autumn, when the temperature is falling, the reverse holds good. This general relation is clearly exhibited in diagrams III., IV., V., and VI., from which may also be traced the two positions annually when the curves cross each other, and that these nodal points do not occur at uniform intervals, but both lie between a minimum and the succeeding maximum. The following table, compiled from a curve of monthly means at Spring Mill, illustrates this point.

[1] See British Association Report, 1891, Cardiff Meeting, p. 454.

Date.	Temperature Characteristics.
1890.	
February	Minimum.
February to Mar..	Curves cross. Air becomes warmer than water.
May to June	Curves cross. Air becomes colder than water.
August and Sept..	Maximum.
1891.	
January	Minimum.
Jan. to February..	Curves cross. Air becomes warmer than water.
June to July	Curves cross. Air becomes colder than water.
July	Maximum.
1892.	
January	Minimum.
March (early) ...	Curves cross. Air becomes warmer than water.
May to June	Curves cross. Air becomes colder than water.

Thus, for the period February to June, the air has the higher temperature; but for the longer period, June to February, this relation is reversed, and the annual averages shew that the reservoir has a mean temperature rather above that of the atmosphere. The figures are:

	Air.	Water.
1890	46·05°	47·03°
1891	45·05°	45·56°

Whilst these mean results are much alike, the extent of the oscillations of temperature of the two elements differs considerably. The annual range is:

	Air.	Water.
1890	46·7°	30·2°
1891	55·4°	29·5°

This difference is, in part, explained by the fact that water does not ordinarily become colder than the freezing point—32°—whilst for air there is, of course, no such limit. It is, however, interesting to find that the water at Spring Mill in January, 1892, on four days registered lower temperatures than 32° (namely 31·5° and 31·8°) without freezing.

(2) The rate of change of temperature is most rapid at spring and autumn periods, the monthly means for two consecutive months at these times differing as much as 11·1° for air and 9·3° for water. Variations of temperature are more marked for air than water, but for both the seasonal fall has been rather more regular than the seasonal rise.

(3) Some of the fluctuations in the curves of daily readings are influenced by the rainfall and the direction of the wind, which are closely connected, as will be seen by inspecting the accompanying chart. There is a tendency for copious rainfall to cause a rise of temperature in the winter months and a fall in the summer months. In this locality the second half of the year has a greater rainfall than the first half. The total fall at Spring Mill is

For 1890	.....	52·160 inches	in 202	days.
1891	.....	58·107	,, 209	,,

(Height above sea level, 771 feet.)

At the Park, Rochdale, it is

For 1890	.....	40·962 inches	in 231	days.
1891	.....	50·222	,, 224	,,

(Height above sea level, 475 feet.)

(4) Observations have been made, intermittently, to determine the relation of the temperature of the feeding streams to that of the atmosphere and reservoir. They shew that (*a*) the temperature of the stream (*like* the reservoir) is above the air in the cold months, but during the summer months (*unlike* the reservoir) it is colder than the air, and (*b*) the stream is always in summer, and often in winter, colder than the mass of water in the reservoir, sometimes in hot weather by as much as 6°.

Finally, the temperature of the water as it issues from the outlet at a depth of 46 feet, has occasionally been tested from January to June of the present year. Up to 50° it has always been warmer than the surface, but it frequently falls below the theoretical limit of 39°, no doubt owing to the disturbing effect of the daily discharge of compensation water. The whole mass of the water does not probably differ much from the surface temperature. Assuming this it is possible to estimate the total quantity of heat received and given up in the course of the seasonal changes. The capacity of the reservoir is 135 million gallons, and if a gallon of water be taken to weigh 10 lbs. the total weight of water in the reservoir will be 602,678 tons. The mean temperature of the three warmest months of 1891 (June, July, and August) was 56·8°, and of the three coldest months of the succeeding winter 35·7°, giving a mean difference of 21·1°. Hence, 602 thousand tons of water are annually warmed and cooled through a range of about 20°, or 12 million (ton degrees) heat units are stored up and given out by this reservoir. This may be more readily grasped by saying that from winter to summer enough heat is received to raise 67 thousand tons of water from freezing to boiling point, and in passing from summer to winter a like quantity is set free.

It is easy to comprehend from these figures how the proximity of large masses of water may modify and moderate climatic conditions.

All the temperatures given in this paper are corrected for instrumental errors.

Cowm Reservoir.

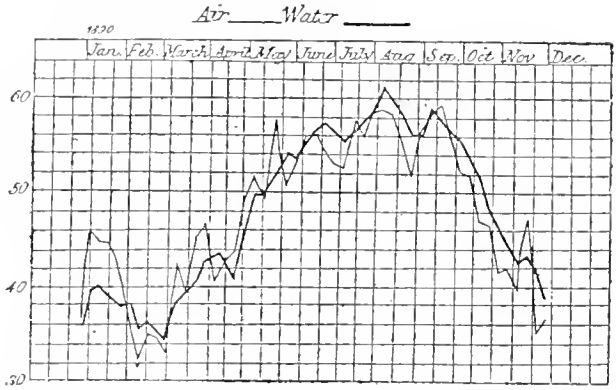
1890.	I. Mean Temp'rature		II. Maximum Temp'rature		III. Minimum Temp'rature		IV. Range of Temp'rature		V. Maximum Difference		VI. Rain-fall.	VII. No. of days on which rain fell
	Air	Water	Air	Water	Air	Water	Air	Water	Air above Water	Water above Air		
	°	°	°	°	°	°	°	°	°	°	Ins.	
January, 12 noon	41·6	38·5	49·8	40·8	24·7	32·7	25·1	8·1	11·0	8·0	7·530	24
February, 9 a.m.	34·9	36·3	44·0	39·0	28·7	33·7	15·3	5·3	5·0	6·4	0·765	7
March	40·1	38·4	50·8	43·5	25·7	32·7	25·1	10·8	11·0	7·0	5·245	22
April	44·1	43·3	55·8	47·5	37·8	42·0	18·0	6·5	9·0	5·0	1·815	10
May	50·7	51·3	61·7	55·8	45·8	46·3	15·9	9·5	7·0	7·0	3·765	13
June	54·8	56·0	63·7	58·2	50·3	52·5	13·4	5·7	6·3	9·9	3·960	18
July	55·3	57·1	63·7	59·4	51·8	55·5	11·9	3·9	6·0	4·4	4·665	18
August	55·5	58·5	63·7	61·7	48·3	54·8	15·4	6·9	2·5	6·9	6·705	19
September	56·7	56·2	62·7	59·7	52·3	54·8	10·4	4·9	5·0	3·5	1·920	12
October	46·8	50·8	55·5	55·9	30·9	44·8	24·6	11·1	1·5	14·9	5·510	17
November	40·3	42·6	50·8	45·8	27·7	38·5	23·1	7·3	8·0	12·3	9·020	22
December	—	—	—	—	—	—	—	—	—	—	0·820	8

Spring Mill Reservoir.

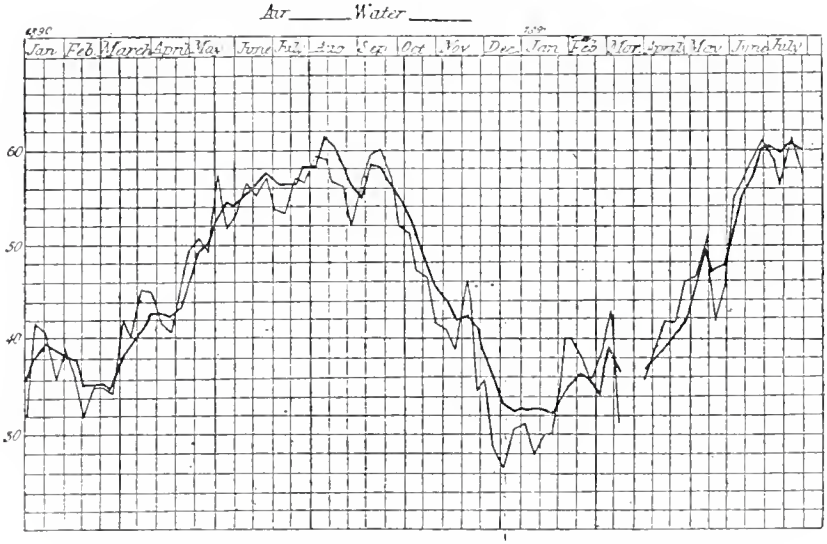
1890.	°	°	°	°	°	°	°	°	°	°	Ins.	
January, 9 a.m.	38·3	38·5	48·8	40·8	22·2	34·7	26·6	6·1	10·0	13·0	7·279	87
February	35·0	36·2	44·0	39·3	29·7	34·2	14·3	5·1	5·0	5·4	0·714	1
March	40·6	38·6	50·8	42·8	26·7	33·2	24·1	9·6	10·0	6·5	5·369	23
April	43·7	43·3	53·8	45·8	38·8	42·3	15·0	3·5	8·0	4·2	1·679	11
May	52·7	51·5	62·7	55·8	46·0	46·3	16·7	9·5	8·1	6·5	3·688	13
June	55·5	56·4	61·7	58·4	50·3	53·8	11·4	4·6	6·0	6·4	3·794	20
July	56·0	57·4	64·7	59·3	51·8	55·9	12·9	3·4	5·6	4·9	4·701	19
August	55·8	58·4	64·7	62·2	49·6	54·4	15·1	7·8	3·5	8·9	6·616	21
September	57·6	56·8	64·7	59·0	51·8	55·9	12·9	4·7	6·2	4·0	2·163	12
October	47·2	50·2	55·4	55·7	30·7	43·8	24·7	11·9	5·0	13·1	5·821	18
November	39·9	42·5	52·8	46·1	27·7	38·6	25·1	7.5	9·4	12·1	9·603	22
December	30·1	34·3	39·0	38·4	18·0	32·0	21·0	6·4	5·5	15·6	0·733	9
1891.												
January	31·94	32·87	43·8	34·7	15·0	32·1	28·8	2·6	10·0	17·2	4·182	16
February	37·06	35·34	44·8	36·8	31·7	33·7	13·1	3·1	10·0	4.0	·425	5
March *	38·38	37·98	—	—	—	—	—	—	—	—	2·995	19
April	40·83	39·08	49·6	41·9	32·4	35·6	17·2	6·3	7·7	3·2	2·242	13
May	46·48	46·88	60·7	50·9	34·4	42·6	26·3	8·3	10·2	11·0	4·499	21
June	57·59	56·17	65·0	60·4	47·4	49·4	17·6	11·0	8·0	6·0	1·793	13
July †	57·64	59·28	63·4	61·6	51·4	57·4	12·0	4·2	3·0	8·0	4·211	18
August ‡	54·10	55·80	58·4	56·4	48·4	54·4	10·0	2·0	2·8	8·0	10·091	26
September	55·54	55·40	70·4	58·6	43·8	53·4	26·6	5·2	13·0	12·6	4·902	18
October	45·99	48·69	54·4	52·4	41·4	44·3	13·0	8·1	3·0	7.1	7.104	21
November	38·96	41·77	46·9	44·2	23·4	38·2	23·5	6·0	4·6	16·0	4·922	18
December	35·16	37·50	46·6	39·9	15·4	33·9	31·2	6·0	8·2	19·7	10·741	21
1892.												
January	32·99	33·87	45·6	37·4	26·4	31·5	19·2	6·9	10·0	10·6	5·787	24
February	34·80	35·76	44·4	38·0	21·4	33·4	23·0	4·6	7·3	13·0	3·637	14
March	34·14	34·38	49·4	37·1	27·4	32·4	22·0	4·7	15.8	7·0	1·376	10
April	43·36	40·55	57·4	42·8	33·4	35·8	24·0	7·0	20·4	8·0	1·916	11
May	50·85	48·32	63·4	55·4	40·4	43·4	23·0	12·0	11·0	3·3	5·280	19
June	54·65	55·65	68·9	57·0	44·7	54·3	24·2	2·7	13·0	10·4	4·441	20

* 14 days only. † 26 days. ‡ 30 days.

CURVE III.—COWM RESERVOIR, 9 A.M.

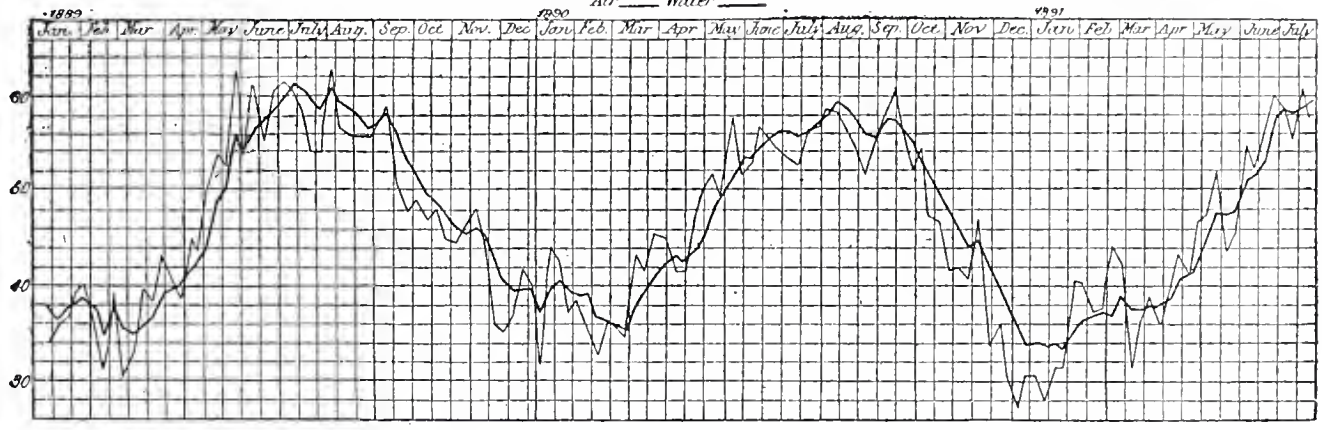


CURVE IV.—SPRING MILL RESERVOIR, 9 A.M.

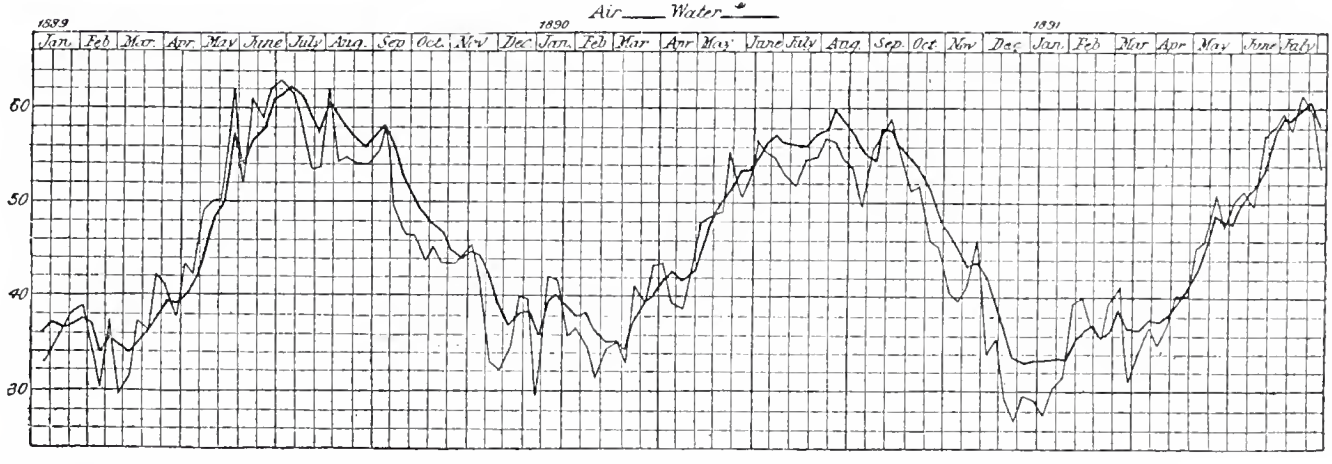


The unit of the curve in these two diagrams is the weekly mean. The annexed diagrams of Piethorn and Denshaw Reservoirs are on the same scale, and are inserted for comparison. The use of these blocks has been kindly permitted by the Secretary of the British Association.

CURVE V.—PIETHORN RESERVOIR, OLDHAM, 9 A.M.



CURVE VI.—DENSHAW RESERVOIR, OLDHAM, 9 A.M.



This Article, which has been translated into English by MRS. H. C. MARCH, *has received the Author's final revision. The original Essay appeared in the Journal* "YMER," *published by the Swedish Society of Anthropology and Geography, and their Council have with great kindness granted the loan of the blocks that illustrate it.*

An Appendix, containing the latest views of the Author, has been specially written for this occasion by DR. STOLPE *himself.*

ON EVOLUTION IN THE ORNAMENTAL ART OF SAVAGE PEOPLES.

Ethnographical Researches by Dr. Hjalmar Stolpe, of Stockholm.

IT was in 1880 and 1881, whilst visiting the ethnographical museums throughout the greater part of Europe, that I became impressed with the preponderating importance to ethnography of comparative studies in the ornamental art of savage peoples. It may seem strange that this field had not been thoroughly worked out long ago, yet such is the case. Many circumstances have exercised a retarding influence on the development of this branch of knowledge. The chief reason for its slow advance was that the greater number of anthropological museums were not yet ordered on scientific principles. The only museums in all Europe that could really be reckoned as scientifically arranged were those in Copenhagen, Dresden, and Rome; that of Comparative Religion, the Musée Guimet, at that time in Lyons; and, as far as its location permitted, the Museum Godiffray, in Hamburg. One exception however must be specially mentioned, namely the rich collection of General Pitt-Rivers, then in London, where typological development was made the foundation of the arrangement of the collection, which at that time amounted to at least 2,000 specimens. Of the remaining museums, the great collections in Berlin, Vienna, Paris, and London, were entirely or in great part warehoused in expectation of removal: in Leyden abundant collections were still in disorder, and the smaller museums and collections remained generally in a very unsatisfactory state and without any scientific arrangement or explanation of their contents. It is clear that the science under such conditions could make but slow progress.

Meanwhile, with a willingness which it will ever be pleasant to me to remember, everything accessible was placed at my disposal in all the museums whatever their condition. In Vienna, for example, they even did not hesitate to unpack for the occasion and on my account what was stowed away in chests in expectation of the completion of the new quarters; and in Berlin, Paris, London, and Leyden, as well as in the smaller museums and collections, unbounded liberty was afforded me to work in the sections not otherwise open to visitors. Nevertheless it was evident that a review of the whole and a direct comparison of the entire series must be a matter of considerable difficulty.

Thanks chiefly to a simple and speedy method of copying carved ornament,[1] I soon found myself in possession of a vast store of accurate copies of entire objects in their original size, as well as of ornamental details; copies that even reproduced every caprice or the slightest error of the carver. In the course of my journey the number of these "rubbings" increased to more than 3,000, not reckoning multitudinous sketches and drawings of details. Thus it has been possible for me after my return to pursue the comparative study of whatever is of importance as regards ornament in most of the European museums. Later on my collection of rubbings has been further enlarged in the course of renewed studies in the European museums, and during the cruise of the Swedish frigate, the "Vanadis," in 1883-85, when I had the opportunity of working in the museums of Rio de Janeiro, Santiago de Chile, and Lima; in private collections at Nukahiva and Tahiti; and also in the museums in Honolulu, Tokio, Singapore, and in various places in Northern India, especially Calcutta.

[1] The method referred to consists simply in laying upon the object a sheet of Japanese paper and rubbing it hard with black wax. By this means the raised parts of the object are delineated black on the paper, so that the details often stand out more clearly and plainly than in the generally one-coloured original, and it ought not to be difficult for any one familiar with technical details in the carvings themselves, to form from these copies a lively idea of the originals. It will be understood that to obtain really good "rubbings," the quality of the paper and wax is of as great importance as practice in their employment. Cuts 12—16 in this essay are direct photographic reproductions of such rubbings without their having been touched; Cuts 22—29, 32, 35—38, 41—49, 53, 55 are drawn after rubbings; Cuts 2, 17, 18, 21, 30, 31, 34, 50, 52, 56, are after my original drawings.

It will therefore be understood that the materials that lie behind my conclusions are far richer than the small selection which can be given here as illustrations.

The comparative study of the ornamentation of savage peoples presents two main objects. *The first* is to find out what is peculiar and characteristic in the style of each people. This kind of research is at the present time, when ethnography is still in its infancy, the more needful because the material at hand for the study of savage art too often suffers from insufficient or quite erroneous accounts concerning its history and origin. Comparative study of ornamentation constitutes the most effective means of correcting such errors. It certainly requires a great accumulation of materials before we can succeed in bringing order into the chaos which confronts us, but, after having overcome the first difficulties, we quickly find that style in form as well as in ornamentation is so clearly fixed and rooted in the designs of savage nations, that at last we are able with absolute accuracy to decide the origin of each object that possesses any distinctive characteristic whatever.

Of the utmost value in this respect is an examination of the art of those who from their geographical position are isolated from the rest of mankind. Islanders will naturally offer the most interesting field of research; shut in by wide stretches of water, hindered by winds and currents at least for considerable periods from any communication with others, they have had good opportunity during their long separation from foreign influence to develop their own peculiar style. If we confine our attention to the peoples of the Pacific Ocean, we find a remarkable tendency to differentiation in this respect, which is most apparent in Melanesia. Not only has each island group its fixed style, but certain islands within the group not infrequently have one also (*e. g.* in the Solomon group); and on larger islands, such as New Guinea, differentiation has established itself even among its separate tribes.

Differences fully as sharp, if not sharper, are found in Polynesia between the scattered island groups, but either political and

social relations among the natives have favoured the extension of a certain style over comparatively wide areas, or the easy entrance and rapid diffusion of European civilisation have caused the destruction of numerous ethnographic objects which, perhaps, might otherwise have opened new paths for culture-investigation. It is well known with what zeal the missionaries used to institute *autos-da-fé* of all that could remind the people of their former heathendom.

It may be advantageous for a just appreciation of the argument which constitutes the subject of this essay, to glance at the principal kinds of style in Polynesia and at their distribution.

If certain smaller, more individual variations of style are excepted, Polynesia may (from an ornamental point of view) be divided into several well defined main provinces. These provinces sometimes comprise merely one island group, sometimes they extend over several. Doubtless, when investigation has furnished a richer and better selected material, some of these main provinces will have to be sub-divided.

I. Province of Tonga-Samoa. The constituent elements in this ornamentation are the straight line and the zigzag line, including its variety—the toothed line. Changes in this simple ornamentation are produced by various combinations of these elements, and mostly by division of the surface into small "fields," the lines in different fields running in different directions. Sometimes parallel zigzag lines, alternating occasionally with straight lines, will cover a great part of the object adorned. Intermixed with this rectilinear ornamentation we often meet with figures of human beings carrying more or less intelligible implements; or of animals, as dogs, cats, swine, birds, or fish; sometimes also that of a fully rigged vessel, evidence that the object has been manufactured, or at least adorned, after acquaintance with white men. These interposed figures are nevertheless to be considered as foreign to the genuine ornamentation, and have probably their own separate problem. An exact distinction between the ornamentation of the two chief groups in this province, Tonga-Samoa, is for the present extremely difficult, because of the prevailing

confusion as to the origin of the objects collected. The most diverse accounts are still to be found in the museums, and the positive critical treatment of this difficult chapter has yet to be accomplished. The islands of Fatuna, Tutuila, and Rotumah, situated near the boundary of the Melanesian district, may safely be included in this province, and possibly also the Tokelau and Ellice groups, although the rather undeveloped ornamentation of the two last mentioned is still insufficiently known. A separate position is taken by the lonely little Savage Island or Nieue lying south of Samoa, whose simple but characteristic ornamentation deviates so considerably from that of the province in general that it deserves to be regarded as a province in itself. It should not escape notice that the province of Tonga-Samoa possesses in the simplest forms of its ornamentation marked points of contact with that extreme eastern outpost of Melanesia, the Fiji isles. This fact fully accords with the well-known culture-connexion existing between Tonga and Fiji.

II. The Maori Province. The distinctive feature in the ornamentation of New Zealand is the curved line possessing a permanent typical tendency to spiral forms, which sometimes reach a high degree of perfection. Although in this it differs from every other Polynesian ornamentation, it is nevertheless not so isolated as one usually regards it, for elsewhere, though rarely, I have met with ornamentation that strikingly resembles that of Fiji. Parallels can also be produced from New Guinea, but they do not necessarily indicate a historical connexion.

III. The Rarotonga-Tubuai-Tahiti Province. Since the typical rectilinear ornamentation of the Rarotonga and Tubuai groups will be explicitly considered in the sequel, its characterisation may now be postponed. As to the reasons for uniting these groups into one province the reader is referred to the section regarding Tahiti on page 81.

IV. The Province of Manihiki. Its ornamentation is confined to various inlayings of wood with discs of mother-of-pearl, and it thus differs essentially from that of the neighbouring provinces. Consequently we are obliged to count this small

island group as a separate ornamental province, although its inhabitants are well known to be of Rarotongan origin. The absence of carved works may be accounted for by the exclusively palmaceous vegetation of these islands, palm-wood being for purely technical reasons quite unsuitable for carving.

V. THE PROVINCE OF MARQUESAS. An ornamentation meets us here utterly unlike all that the rest of Polynesia has to display. Instead of an evenly spread, tolerably uniform system which with slight changes covers the whole of any continuous surface, we find a multitude of sharply differentiated designs mingled together with comparatively great freedom and mobility, often leaving large surfaces bare. Besides human faces in several highly conventionalised forms, there are numerous independently constructed conventional designs, which all, as far as is known, have their separate names and their separate signification. We thus have an ornamentation which is differentiated quite up to the verge of picture writing, yet without ceasing to be real ornament. This fact, which has never received adequate attention,[1] deserves to be considered in connection with the discovery made long after (in 1868) of actual picture writing on Easter Island, the outermost representative of Polynesia in the east.

VI. THE PROVINCE OF HAWAII. The preponderating ornamentation is linear. Straight lines with knob-like excrescences; zigzag lines and stars on calabashes; parallel or crossing straight lines, with dots in the chequers made by the intersections, on "tapa" mallets and stamps; curvilinear perforated carvings on drums; and painted and simple textile ornament on "tapa" rugs and mats;—these include almost all the ornamentation of the

[1] TILESIUS, *Ueber den Ursprung des bürgerlichen Lebens und der Staatsform in den Südsee-Inseln und zwar auf der Insel Nuckahiwah, einer der Washington-Inseln;* PÖLITZ' *Jahrbücher der Geschichte und Staatskunst.* Leipzig, 1828. Bd. 2, p. 133—168, Mit einer lithographirten Tafel in Folio. Tilesius, who accompanied v. Krusenstern in his voyage round the world 1803—7, accounts fully for a multitude of the names and meanings of designs. Before Tilesius, but less fully and in one case erroneously, the subject was treated by another member of the same expedition, v. LANGSDORFF (*Bemerkungen auf einer Reise um die Welt*, Frankfurt am Mayn, 1812. Bd. 1, p. 105 ff. Taf. 9). The only writer who seriously takes up Tilesius' explanation of the matter is H. WUTTKE, *Die Entstehung der Schrift*, Leipzig, 1872. The subject will be further discussed in an Essay now in hand on tattooing.

Hawaiian Islands. Even here indications are found that each several decoration has its determinate meaning.[1] The extremely grotesque figures of gods in wood or plaited work must of course not be reckoned as within the domain of ornamentation, at all events they do not seem to have given rise to any decorative conventionalisation.

A large group is left, in this review, quite out of sight, namely, the Poumotu islands and the Gambier islands lying south-east of them. The reason is simply that we know so infinitely little about their ornamentation. To judge from a few examples it was probably linear of the simplest kind. Whether it resembled more nearly the Rarotonga-Tubuaian type or that of the Marquesas it is at present impossible to determine. The paddle-forms from the Gambier islands certainly approach those from the Marquesas islands, but this cannot counterbalance the fact that the dialect of the inhabitants is akin to that of Rarotonga (Hervey).

The great diversity in ornamentation to be found in Polynesia is manifest from the above review. And yet we have here to do with one and the same race of people, possessing the same speech and the same culture.

To follow the gradations of style from West to East is of singular interest. A genetic connection between the varying kinds can not be proved, yet a marked increase in culture development is unmistakeable. The further we come towards the East from the simple geometric ornamentation prevailing in the West, the higher and higher are the forms of style that appear. In this chain the picture writing of Easter Island constitutes the last link. A stage on the way, full of the deepest import, is the significant ornamentation of Rarotonga-Tubuai (Prov. III). After a still more splendid development in the Marquesas islands, carved ornamentation may be said wholly to disappear on Easter Island, and to be succeeded by carved picture writing arranged in regular lines. Picture writing arises and ornamentation its forerunner dies. Thanks to the significant

[1] BASRIAN, *Inselgruppen in Oceanien.* Berlin, 1883, p. 263.

ornamentation of the Marquesas islands, the picture writing of Easter Island is no longer an isolated inexplicable fact in Polynesia.[1]

So far, I have given some account of one of the two main objects which the student of comparative ornament sets before himself, and have shown that it is attained by defining the characteristics of each province. But scientific investigation cannot, of course, stop there. The more plainly we see the persistency of each kind of style, the more inevitably does a conviction press upon us that some deep-lying cause will have to be found for the perpetual repetition of these details, which might often seem to be of quite trifling importance, considered as ornament. They cannot stand there for no reason. They must have some meaning. Such clear indications as are afforded by Marquesas ornamentation cannot often be obtained. In most other cases we must, by analytical research into vast comparative materials, be gradually led to a comprehension of *their meaning*, and this is the second main object in the study of ornamentation. The doctrine of evolution, which has had such a fruitful effect on so many dissimilar sciences, finds a rich field in this part of ethnography also.

On studying a large collection of ornament we often find that certain details, though at first sight insignificant, yet by means of a series of intermediate forms, become explicable as rudiments of emblems derived from organic nature. The rudiments may be more or less evident, yet they will always resemble and symbolise and suggest the image from which they originated. In their latest stage the primitive signification is indeed so lost that they pass, degraded, into mere meaningless decoration. The fact is too

[1] The question is more fully discussed in my discourse at the Congress of Orientalists at Stockholm, September 7th, 1889. New Zealand, moreover, has also a substitute for writing in carvings on sticks or boards, *e. g.*, the History of Ngati-Rangi's tribe, set forth on a stick now in the British Museum (EDGE-PARTINGTON, *Album of the weapons, tools, ornaments, etc., of the Natives of the Pacific Islands.* Manchester, 1890. Plate 375, fig, 1), and the carved staves and boards mentioned by BASTIAN (*Inselgruppen in Oceanien.* Berlin, 1883, p. 191, 197, 263), which he calls "Hokka poppa" (*i. e.*, laid on each other), and "He waka paparanga rakau." Cf. further the token writing of the Hawaiians on kapa (tapa); BASTIAN, l. c. p. 263.

familiar, both in Archæological typology and in the history of Art, to want a more extended illustration. It is, however, surprising how often in the ornamentation of savage people, examples are found of a purely linear ornament that nevertheless springs from figures of men and animals. Curiously enough, the vegetable world seems to have afforded far fewer subjects for conventionalisation among genuine savages.

It is to several of the most interesting examples in this department that these essays will be devoted. The series, which begins with a little history of typological development from the Rarotonga and Tubuai groups in Polynesia, will be continued with corresponding contributions from other island groups in the Pacific Ocean and from South America.

I.—RAROTONGA AND TUBUAI ISLANDS.

A.—Their Ethnography.

The Rarotonga or Hervey group consists of seven inhabited islands, situated 1,100 km. S.S.W. from Tahiti. Most of them were discovered between the years 1773—1777 by Captain Cook, whence they are also, chiefly by the French, called after him. The largest is the mountainous and picturesque Rarotonga, of volcanic origin. Secondly come Mangaia to the S.E., with Atiu (Katutia), Mauki, Mitiaro, Manuai, and Aitutaki to the N.E. and N. of Rarotonga, all (excepting the atoll Manuai) lofty coral islands. Yet an eighth, Palmerston Island, lying far N.W., formerly inhabited, had been abandoned prior to its discovery in 1774. The ninth, Takutia, is uninhabited. The people resemble in general those of Tahiti, and speak a dialect which stands midway between the Tahitian and the Maori. Legends preserved by a certain family on Rarotonga, make it likely that immigration took place from Samoa, and similar legends are met with even on Mangaia. But from Tahiti also settlements have taken place, probably at a time when the Hervey islands, as well as Tahiti, were subject to Raiatea, as the most Sacred of the Society isles. The Hervey group itself appears to have colonised the Tubuai

or Austral islands lying S.E. (Rimatara, Rurutu, Tubuai, and Raivavai are inhabited, and also Oparo or Rapa-iti situated furthest to the south), and the resemblance in culture between these two island groups extends even to the ornamentation and the shape of the implements. Of the indigenous ornament of Tahiti and the isles thereto belonging, strange to say, little has been preserved.[1] But the productions of the Hervey group seem to have had such an extensive diffusion over the Tahiti group, that both may reasonably be reckoned in the same ornamental province. Mangaia is especially mentioned by several authors as the principal place of production of the richly carved axe shafts and paddle-shaped implements, &c., whose ornamentation constitutes our subject. It seems as if the Hervey islanders in general were more energetic and industrially enterprising, perhaps less demoralised than the effeminate Tahitians. Their considerable development shows indeed the speed and completeness with which they, perhaps in a higher degree than any other of the Southern or Central Polynesians, have adopted the European civilisation. In a religious aspect Hervey islanders and Tahitians stood in closest relationship to each other. This may serve to explain the diffusion of objects with religious ornamentation and symbolism, and probably designed for religious purposes, which, if one may believe the multitudinous accounts of origin in various museums, are thought to have spread from the Hervey isles to Tahiti.

That this ornamentation which we are about to describe has its root in religious rites, nobody can doubt. It is certainly proved that much mischief is perpetrated in Ethnography as well as in Archæology, by ascribing to everything for which no other interpretation can be found, a religious origin. But within the domain of Polynesian ethnography such an ascription is nevertheless authorised, for the whole life of the people is so penetrated

[1] My collection contains the copy of a most curious Tahitian lance, which shows a disposition to a "deviating" ornament. The rubbing was made by myself in Tahiti, and the absolute authenticity of the original was ascertained on the spot. I await, however, further information before following up the trace thus found.

with religious ideas, that it would probably be more difficult to find a case in which religion did NOT play a part than to show the opposite. There is scarcely an action ever so profane in our eyes that does not stand under the protection of a separate divinity.[1] In short, in everything, even in artificial objects, dwelt a god, or the thing was itself a god. No wonder, then, that we find in the adornment of these objects a fixed conventional symbolism.

In order that the ornamentation may be rightly understood, a short exposition is needed of a few of the principal features of their mythology, so much at least as is requisite for our purpose, to show the place in the Polynesian pantheon of some of the principal deities. To adjust frequent contradictions is no light task. It is clear that the traditions on the different island groups must vary greatly. They undergo a change in the course of time, even on the same island. All the more welcome then is the Rev. W. Wyatt-Gill's detailed account of the mythology of Mangaia, which after twenty-two years of efficient mission work on the Hervey islands, he was able to bring under the laws of science.[2] With only a change of name, the same account holds good for Tahiti and numerous other islands, at least within the province with which we are concerned. To the remote position of the Hervey islands on the fringe of Polynesia is due the pure and perfect preservation of these myths.

The Mangaians pictured to themselves the universe as a large hollow cocoa-nut (see diagram No. 1). The space within is called Avaiki. Lowest down in its tapering stem dwells a demon or spirit, *Te-akia-ia-roe*, or "The root of all existence," This is the first, the most primæval of all beings. Above, there dwells *Te-tanga-engae* or *Te-vaerua*, which means "breathing" or "life." Higher still, in the thickest part of the stem, is *Te-manava-roa*,

[1] WAITZ-GERLAND, *Anthropologie der Naturvölker*. VI., p. 297, 8. It may be added that on the Hawaiian islands, tapa-beating stood under the protection of Hina, the moon goddess. The same myth seems to be found on the Hervey islands. GILL, *Myths and Songs from the South Pacific*, pp. 45—47 (*The woman and the moon*).

[2] WYATT-GILL, *Myths and Songs from the South Pacific*. London, 1876.

the "long-lived," as the name is usually translated.[1] These three are the original creating and sustaining principles in the universe, and are apparently of an abstract nature. Inside the nut, in the lowest depths of Avaiki, lives a woman—a demon, of flesh and blood—named *Vari-ma-te-takere*, or "the very beginning,"[2] also called "the great mother." Her dwelling (*Te-enua-te-ki*, "the mute-land,") is so narrow that she is obliged to sit with her knees drawn up to her chin, probably an allusion to the position of the fœtus. She first created *Avatēa* or *Vātea*, *i. e.* "Noon," a god one of whose sides is in the form of a man, and the other in that of a whale. He dwells in *Te-papa-rairai* or "the thin land." His human eye is, according to some, the sun, and his fish eye is the moon. These move up and down through two openings in the upper end of the nut and enlighten in turn the upper world and Avaiki.

After Vātea, the great mother framed *Tinirau*, the "Innumerable,"[3] who lives in *Motu-tapu*, the "Sacred isle," and is lord of the fishes. Both these were made from bits which she tore off her right side. From her left side she took successive bits which became *Tango*, or "Support," who lives in "the land of red parrot feathers" (*Enua-kura*); *Tumuteanaoa*, or "Echo," who lives in "the hollow grey rocks" (*Te-pārai-tea*); and *Raka*, or "Trouble," who presides over the winds, and whose home is in *Moana-Irakau*, "the deep ocean." Finally, when the great mother found that the left side had been more injured than the right, she took from the latter her sixth child, her daughter *Tu-metua*, "Stick-by-the-parent." *Tu* became the mother's favourite child, and lives with her down in "the mute land."

Vātea sees in dreams a female being, Papa, who becomes his

[1] *Manava* means properly belly, stomach, intestines, and the name ought consequently to refer to bodily greatness, but GILL seems to have ground for giving it a more figurative meaning.

[2] Literally "The beginning and the bottom" of the hollow cocoa-nut shell, *Vari* = mire, earth.

[3] *Tinirau* literally means "forty millions" (*tini* = 200,000, *rau* =200). GILL, *Myths, &c.*, p. 95.

mate and bears the twin brothers Tangarōa and Rongo.[1] These were the first beings in perfect human form. Afterwards were born Tonga-iti (who as *Mata-rau*, "the two-hundred-eyed," is worshipped on the Hervey islands), Tangiia, and Tane-papa-kai (*i. e.* Tane, piler-up of food). Of these five sons of Vātea, Tangarōa is the cleverest, and the father wishes therefore to give him all his possessions. The mother shows the danger of this course by reminding Vātea that in such a case they as parents would not dare to touch anything that belonged to Tangarōa as the eldest. The wealth is then so divided that every thing RED on the earth becomes Tangarōa's, while all the rest falls to Rongo. Clearly Tangarōa must be the loser by this partition, for among all the varieties of taro root and of bananas but a single red one of each is found. These he receives, together with the red-leaved chestnut, ONE kind of yam, ONE kind of cocoa-nut, four kinds of red fish, and the lobster. Further, all light-haired men are regarded as Tangarōa's children.

The black-haired Rongo has three sons (or daughter-sons), Rangi, Mokoiro, and Akatauira, the first of whom is especially famous because it was he who conceived the idea of hauling up Mangaia, or Auau, as the island was called in those days, out of the under-world, a feat which he accomplished with the aid of his brothers. But as all things consist of body and soul, so does this island, and when its body was brought up to the surface of the sea, its soul, called by the priests Akatautika ("the well-poised"), remained behind in Avaiki. Rongo's three sons are the first inhabitants of the upper island.[2] The father lives in the under-world as the god of night and war.

Tangarōa, however, discontented with the unequal division of the property, abandoned Auau, and seeks for himself a new place of abode, which he finds at last on Rarotonga and Aitutaki. After his departure the island received its new name, Mangaia or "peace."

[1] Tangarōa in the dialect of Tahiti is Taarōa, and Rongo becomes Roo or O Rō, under which name he is best known in narratives of travel.

[2] GILL, *Myths*, p, 19, regards it as probable that these were "veritable persons, chiefs of the first settlers."

Tangarōa is worshipped throughout the whole of Polynesia, but especially on the Hervey and Tubuai islands and on Tahiti, and is there regarded as the chief god. The myths concerning him vary on the different island groups, and it is probable that he is in some places confused with Vātea. His offspring are gods of a lower order and are called Tangarōa's children. He is said to have created the world and produced mankind out of his back. According to some, he formed them out of *red earth*. It is related also that he changed himself into a boat, and in this way carried mankind over the sea. Of the innumerable myths about Tangarōa[1] a last one may be quoted, that he rules in the ten heavens, whither come the ghosts of those that have fallen in battle.

To those who have died a natural death, the myths assign another habitation. They go down to the under-world, to Avaiki. There they are under the sway of Tiki, the king of the *subterranean* paradise. In Rarotonga, Tahiti, and New Zealand, he is supposed to have been *the first man*.[2] He is the prototype of a large group of god-like beings who have all been human, and who after death are exalted as gods of a lower rank than the great deities before mentioned whose generic name is *Atua*. *Tiki*, regarded as a separate class of gods, are consequently ancestral spirits who have become entitled to divine worship. They are the tutelary genii of their descendants and are honoured with images in which, upon certain occasions they take up their abode. Such images are of many descriptions, from the colossal stone statues on Easter island, to the small idols of polished nephrite which Maoris carry on their persons.

The real original Tiki, king in Avaiki, receives in his subterranean kingdom as already mentioned, the ghosts of those dying a natural death. Their destiny is variously described. According to some representations they are devoured by Tiki and destroyed; according to others, after enduring severe trials, they live eternally

[1] Full accounts of him may be found collected by WAITZ-GERLAND, VI., p. 231, et seq.

[2] According to others, Rangi was the first man. GILL, *Myths*, p. 114.

in a blissful state, which consists apparently in an ample satisfaction of every want of the body.

Extraordinary as it seems, this Tiki is in certain places regarded as female, for example on Mangaia. There Tiki is sister to Veêtini, the first man who died a natural death.[1] She sits on the threshold of a long house down in Avaiki, and receives the ghosts of the dead, but only those who bring her an offering. He who brings no present with him must stand without the house in rain and darkness for ever, shivering with cold and hunger, all the harder as he can see, the while, how the happier-fated ones enjoy their life inside.

It appears that Veêtini (who, shortly after his death, was permitted, on account of their heart-rending lamentations, to revisit his parents and his sister Tiki,[2] who was yet living,) gave precise directions for mourning ceremonies and offerings to the dead. The offerings must consist of food, which is buried with the corpse. At a burial in Mangaia, the body was let down into a deep chasm (one for the nobles and one for the common people), whither the offerings were after to be cast. The latter consist of five old cocoa-nuts, which are opened and the water poured out upon the ground. Afterwards the nuts are each wrapped up in a leaf and native cloth and are, with other food, cast one by one into the chasm, while each time the mourners call to the dead by name, and cry "Here is thy food, eat it." When the fifth nut and its accompaniments are thrown down, the mourners cry "Farewell! we come back to thee no more." According to Rarotongan custom the offering consisted of the head and kidneys of a swine, a cleft cocoa-nut, and a kava-root.

This glance at the religious system of the islanders has had for its aim briefly to indicate their range of ideas. Their art, if such

[1] WYATT-GILL, *Myths*, p. 170.

[2] She came herself to the under-world in the following manner. Evil spirits, the so-called *Oromatua*, used to come up through the aperture on the western side of the island by which the sun and the dead descended to the under-world, and spread disease and death amongst mankind. In order to prevent this from happening again, the beautiful Tiki cast herself *alive* into the abyss which instantly closed over her. The sun and the dead were afterwards obliged to seek another path to the under-world, but Tiki's object was won—the evil spirits return no more.

an expression may be allowed, will be the better accounted for in the following pages. It was necessary to a certain extent to become familiar with the indisputable poetic vigour of these peoples, in order to do justice to its reflection, often obscure, in their ornamentation. The quotations given above may serve to interpret certain facts in the history of ornament, which would otherwise remain incomprehensible.

B. Ornamentation.

In most ethnographical museums and collections we find a kind of well wrought polished axes of basalt, with richly carved wooden handles, whose peculiar form shows that they could not be used for practical purposes. Sometimes they are quadrangular, slowly diminishing upwards towards the axe itself (cuts 4 and 5), sometimes conical (cut 6), sometimes polygonal (cut 7), or composed of these three forms so that the lower part of the shaft to a greater or less height is quadrangular, and the remaining upper part round or polygonal (cut 8). Often the shafts are so thick underneath, that two hands could scarcely grasp them. In such cases the axe can easily be set upright on the wide base of the shaft. In other cases we meet with more uniform shafts—round, quadrangular, or polygonal (something like cut 7 but smaller)—which, being of less diameter, might without inconvenience be held in the hand. Even such axes as these seem scarcely fit for practical use, and the typical, rectangular, geometrically regular ornamentation wherewith similar shafts are entirely covered, permit us to affirm that they are not designed for any ordinary profane purpose.

Axes with smooth, round, slender shafts, easier to handle, are relatively rare, probably because in comparison with those richly wrought, they have not been looked upon as valuable by the greater number of travellers returning to Europe. In the British Museum one occurs whose shaft is terminated below by a conical knob in the usual Hervey style (cut 9). It is reported to come from Raivavai in the Tubuai group. The Musée de la Marine in the Louvre, has also some similar ones (Nos. 2,478 and 2,479)

said to be from Mangaia, without, as far as I can remember, terminal heads on the shafts.

Among other characteristic objects from the Hervey and Tubuai isles are *paddle-shaped* implements, entirely covered with carving much in the same style as in ordinary axe shafts, but into their ornament new elements enter, as we shall presently find. The heads at the ends of the shafts are either flat and rectangular (cut 10), or like an inverted cone (cut 19), and always exhibit human figures more or less conventionalised. Cut 15 shows the entire blade of such an implement, and cuts 12 to 14 parts of other similar blades. As to the possible use of these paddle-like implements, the same uncertainty exists as in the case of the axe shafts. In fact we know almost nothing about their history, and perhaps they may have had quite another purpose than that usually ascribed to them. They will be discussed further on.

The same characteristic ornamentation is met with on a multitude of other objects, as lances, staves, drums of various shapes, wooden bowls and other vessels, and also on certain large oval scoops with long handles, which possibly are only variants of the before-mentioned paddle-shaped implements.

Apart from the unmistakeably human figures on the shaft-heads of paddles, on the terminal knobs of scoops and staves (cuts 18—27, 30, 31), or on drums and their stretching blocks (cuts 28, 29), we find, all over these objects, an ornamentation which is made up of a few elementary details.

On axe shafts, for example, the above-mentioned rectilinear ornament suggests a network with meshes of a quadrangular shape. At the first glance it seems composed of regular squares and rhombs, bounded by crossing flat bands. On closer examination, however, each quadrangle proves to consist of two triangular incisions, parted by a sharp ridge (cuts 36c and 39). Often the crossing bands separate from each other, so as to create zigzag bands, united by sharp ridges (cuts 32, 33, 36, and 38). By cutting deep furrows, or by a complete breaking up of the pattern by means of square holes through the object, interruptions of this line-system sometimes occur (cuts 36b and 37), such as at first

sight seem to produce new ornaments. On closer examination, however, these are easily recognised as fragments of the former design. A rarer system of ornament consists in equilateral triangular surfaces placed in rows one over the other, and so arranged that the base of each triangle rests on the apex of the one below (cut 41). Thus, as far as I know, is the whole of the rectilinear ornament on axe shafts completely characterised. It is worth mentioning that those crescentic incisions, which on the shafts of "paddles" alternate with the rectilinear ornamentation, seem never to have been found even on slender cylindrical axe shafts.

Representations of the human figure are seen only on such axe shafts as have conical ends (cut 9). On the paddle-shaped implements, however, the occurrence of human figures on the terminal knobs of the shafts is the rule; whether in more or less relief on the knob like an inverted cone at the end of the handle, or whether they are incised on the flat surface of a rectangular terminal. Along with the before-mentioned linear ornamentation, appears both on the shaft and on the blade of these implements (cut 12), a kind of crescentic incisions usually combined in rows one over the other, but separated by a small sharp ridge. Sometimes they are in groups which turn now their concave (cut 14) now their convex (cut 57) sides to each other. Another new element in these objects, never met with on the axe shafts, is concentric rings alternately simple and toothed (cuts 13, 14, 16). Toothed straight lines (cut 11) occur usually as border lines between the different "fields" on "paddle blades," or along their edges. They are employed, for the most part, wherever border ornament is needed. It is doubtless this ornament that, according to WYATT-GILL, is called "sharks' teeth pattern" *(nio mango)*, the more probably as it also appears under exactly the same name in the Marquesas isles.[1] In Hervey-ornamentation

[1] W. GILL, *Jottings from the Pacific*, p. 223. "The fine pointed pattern is known as 'the sharks' teeth pattern' *(nio mango)*, from *nio* = teeth, *mango* = shark. The same ornament is called in the Marquesas islands '*niho peata*' *(niho* = tooth, *peata (piata)* = shark, and signifies in the designs of tattooing the duty of diving to catch sharks." (TILESIUS l. c. PÖLITZ, *Jahrb.* 1828, 2. p. 157, 159, 160). LANGSDORFF *(Reise um die Welt*, I. Taf. IX., Fig. 6 u. 7) adopts the same name, and adds "Diese einfache Figur wird bald hier, bald dort als Verschönerung und Ausfüllung einer Lücke angebracht, und auf mancherlei Weise in der Zusammensetzung verändert."

the *nio mango* pattern sometimes appears as intersecting lines, enclosing unornamented chequers; for example, on a long lance point in the Boulogne Museum.

To the already enumerated elements ought further to be added those parallel zigzag lines, in some cases alternated with straight ones, which occur so often in Western Polynesia; and then the whole stock of ornamental details in these islands is exhausted. As regards their relative position, they are usually arranged in quadrangular "fields" (as in cut 12), or in parallel bands (as in cuts 13, 14). The triangular fields shown on the paddle blade (cut 15) are extremely rare. The concentric patterns usually stand in rows when they cover large surfaces, as the "paddle" or quadrangular slab (cut 16).

Several special forms of ornament, deviating from those now figured, will be separately treated before concluding this essay.

That the whole of this ornamentation, highly intricate in its combinations, should be carved with so simple an implement as a shark's tooth is most remarkable. The wood is said to be "Pua" (Fagræa Berteriana),[1] of the Loganiacean family, one of the sacred trees of Polynesia.

We shall presently see that among all the different elements in the decoration of axes and paddle-shaped implements an organic relationship exists, which proves that they have each been derived from one and the same prototype, *a human figure.*

We will now consider the paddle-shaped and scoop-shaped implements. On these the ornamental elements occur in every stage of conventionalisation, beginning with undoubtedly human figures, whereas on the axes we meet only with such as have undergone much transformation.

The first-named implements consist of a shaft furnished with either a flat rectangular terminal or an inverted conical one, and also a flat oviform blade (cuts 10 and 15). On the flat terminals, usually about 15 cm. broad, 10 cm. high, and 2 cm. thick, we find one or two rows of human figures, two to five in every row. When

[1] W. GILL, *Jottings*, etc., pp. 189 and 223.

the shafts are quadrangular, figures of the same kind sometimes occur on the lateral surfaces, but usually, and always on the round shafts, we find only the same linear ornamentation as on the blades. A distinctive feature in the human figures is that they are always represented *squatting* down, with outspread knees and outstretched hands (cut 17). These figures are invariably decorated with a pointed toothed ornament, the before-mentioned "sharks' teeth" pattern, which forms a kind of collar, but runs also along both the arms and the legs. Sometimes it makes a sort of crown on the head. The figures are always indicated by similar tooth-shaped incisions. What next strikes the eye in these human figures is the pointed breasts, which continually recur and evidently denote a *female* type. The crouching attitude, with outspread knees, while bringing to mind the Tahitian *upa-upa* dances, or the *hula-hula* of the Marquesans and Hawaiians, has not, as far as I know, any particular significance.

When this type of figure appears on the inverted conical terminals, it is naturally compelled, in accordance with its position, to undergo considerable alterations. We find the human figure in its most distinct form on the knob of a paddle-shaped implement in General Pitt Rivers collection in Oxford[1] (cut 18), where the four figures stand with their backs against each other, and are sculptured in the round. Their arms are fused together into curves which unite the bodies. The legs, as is seen from the slight sketch, are considerably reduced, but preserve their characteristic attitude. But most frequently the figures on the terminal knobs have large heads carved in high relief, and large, round outstanding eyes, as in cut 19. The nose is marked in the same way as on the flat figures. The eyes are decorated with two horizontal rows of "sharks' teeth," though elsewhere they are adorned with concentric rings, and of these, one or more, according to the size of the eyes, is composed of "sharks' teeth" pattern alternating with simple rings. Cut 20 shows a diagrammatic drawing

[1] LANE FOX, *Catalogue of the Anthropological Collection.* London, 1877, No. 551, Pl. VIII., Fig. 7. General Pitt Rivers formerly bore the name of Lane Fox.

of such a visage in its simplest form. The concentric sharks' teeth patterns, which we will henceforth call "eye" patterns, occur as before-mentioned as an ordinary decoration on the blades of the paddle-shaped implements, and even upon their shafts.

Returning now to cut 19, we see there how the arms run together in the same way as in cut 18. Figures with free arms and hands I have never seen on the conical knobs, even when these are wrought in the round, as sometimes happens on very large knobs. The legs with the curved thighs are easily recognisable, although the shins, in consequence of the shape of the knob, take a somewhat different form from those of figures carved on a plain surface. The pointed breasts are apparent in all the figures. Only once have I seen a sort of hermaphrodite development (cut 21) in one of the eight figures round the conical knob of a paddle-shaped implement in the Ethnographical Museum in Vienna. It is quite exceptional and is perhaps accidental. The pointed breasts are alike distinct in this and in the seven remaining figures on the knob, as well as generally on the figures in question. The elevated ridge which runs straight down from the trunk to the base in the case of most figures on the flat heads, and on whose upper end the crouched figure appears to rest, I suppose to be only a formation originally produced by paring down on either side, and which may have been left, and in some cases further conventionalised, simply on account of a tendency to fill up the empty space. Why it divides itself below, as in cuts 28 and 29, into two or three points I cannot explain with certainty, for lack of intermediate forms.

In cut 17 we see how the hands and knees of two contiguous figures are fused together. Such a tendency to amalgamation is characteristic of the whole of this ornamentation. In cut 22, taken from the terminal of a paddle-shaped implement in the Vienna Museum (three figures in a row), we find in the main the same motive as in cut 17, only that the hands here are free, and that the face is conventionalised by means of the "sharks' teeth" pattern. In the field below the figures we find half-moon shaped incisions, alternating with similar crescentic "sharks' teeth"

patterns, which will be explained presently. On the ends of this terminal occur a pair of peculiarly conventional forms of the same human prototype, which are introduced here (cuts 23 and 24) as they have no more appropriate place in the series of developments. In both the faces are utterly deformed. The upstretched hands are again discernible, especially in cut 24. The breasts have disappeared in cut 23, but are found in cut 24. Athwart the figures goes a straight band, and under this a single curved thigh whereon the two legs, still evident in cut 23, become fused into one in cut 24. In cut 25 we again meet with exactly the same type as in cut 17. The principal modification is that the lower field, bordered by the "sharks' teeth" pattern, leaves room for only simple curved incisions.

A singularly pretty series of developments is found on both sides of the terminal of a "paddle" (9770) in the Museum in Vienna. On one side (cut 26), we have uppermost a row of five figures, whose arms are united together with a straight cross-band which separates the heads from the bodies, recognisable by all the usual details. In the lower field we find bodies only—the heads have altogether disappeared.

If we look at the other side of the terminal (cut 27), we see in the upper field just the same figures as in cut 26, but in the lower field are only three rows of the crescentic "sharks' teeth" pattern. On comparing these with the similarly formed and ornamented thighs on all the figures previously delineated, as well as on this very object itself, we perceive with what facility even so important a part as the head tends to disappear. We are, perhaps, not too bold, if we recognise in this triple row of crescentic patterns a three-fold repetition of the line which is represented in the upper figure, and which is formed by the fusion of knees and thighs. When we look back to cuts 22, 23, and 24, and see how these "thigh patterns" are composed of simple half-moon shaped ridges, it is reasonable to infer that even the four-fold rows of crescentic ridges, in the lower field of cut 25, are nothing else than rudiments of the "thigh pattern" in cut 27. In this, its simplest form, the pattern occurs very commonly on paddle-shaped imple-

ments, both on the shaft (compare cuts 19, 22—27 and 57, and on the blade (cuts 12—15), the drum (cut 28), and the lance (cut 35).

Cut 28 is taken from a richly carved drum in the Museum für Völkerkunde in Berlin, on which is seen the transformation of the limbs through all their just mentioned grades. In the upper row here delineated (the two rows alternate regularly over a great part of the surface of the drum), we see the arms fused together in curves with "sharks' teeth" patterns. The thighs and legs, on the contrary, have been reduced to simple ridges, and in consequence of their parallel position, the legs are able to be furnished with a common foot, which like the hands in other cases, is represented by three "sharks' teeth." The trunk has received a more solid form, but the characteristic breasts continue to be clearly marked. A new feature is that the usual ridge, which extends downwards from the trunk to the base of the field, terminates in a fork of three or four prongs, represented by "sharks' teeth." The lower end of the trunk is marked by the same pattern pointing upward. My belief is that this base is to be understood merely as a filling-in ornament, in such wise as the "sharks' teeth" pattern is sometimes employed. That any sexual feature is to be suspected here I question. The art of Hervey has, for such a case, far more expressive means of representation at its disposal.

I pass by till another opportunity the characteristic band which separates the two fields, and go on to speak of the rudimentary figures in the lower field. Here we find the heads quite plainly represented, but for the nether as well as for the upper extremities a simple system of curved lines has been substituted.[1] Under each head we again meet with a trident of the same shape as those occurring in the upper field. Cut 29 shows the form of one of the cleats by means of which the drum-strings are stretched. The details of the figure are similar to those of the figures in the upper field of cut 28, only that the arms and legs are more naturalistically given, and that the fork under the trunk is two-

[1] Through a mistake in reproducing the rubbing, the usual vertical separating lines between the curves are not marked. They ought to connect each head with the trident found underneath.

pronged. A special matter of interest, as we shall find further on, is the form of the feet.

Returning now to the scoop in the Basle Museum (compare cut 17), we find that the broad sides of its flat shaft are adorned from end to end with figures, arranged two and two, exactly like those on the terminal knob. But even the narrow sides have an ornament, which is manifestly derived from the well known human figures on all the examples already quoted. Here, however, by reason of the straitened space, the figures have been considerably reduced in size, and, for the same reason, they have been rendered in a form altogether rectilinear. With the preceding series of developments before our eyes, it ought to be easy for us to recognise upon this part of the scoop two utterly conventionalised human figures, one over the other. The heads have become angular and are adorned with "sharks' teeth" incisions, something like what occurs in cuts 22 and 24. The arms and legs are symmetrically bent, and are extended towards the neighbour on either side that of itself constitutes an ornamental border, though for want of space or from poverty of decorative motives, only one-half of these side neighbours is represented. All the figures are bedecked throughout with the "sharks' teeth" pattern. If we compare these figures with those on the small sides of the "paddle" terminal (9769) in the Vienna Museum (cuts 23 and 24), it will probably be admitted that cut 24 is far more conventionalised than cut 31.

Hitherto the human prototype has been easy to recognise. It has always preserved some rudiments which make the identification incontestable. This becomes more difficult when it entirely passes into ornament, but even then we sometimes find an intermediate form which links it to the prototype.

In cut 31 we have the type converted into a rectilinear form, whose limbs join with those of each comrade in a sharp angle. But the head and trunk are still obvious. The next step is for the head to disappear and for the trunk to be reduced to a sharp ridge, which is attached to the two zigzag lines into which the extremities have been transformed (cut 32). In this guise the

ornament is found on paddle-shaped implements, as well as on axe-shafts, spears, staves, drums, &c., sometimes covering large surfaces, and sometimes forming a single band. We recognise it in cuts 19, 25—28, 33, 35, 36, 38, &c. On the axe shafts it is the prevailing motive. The technical execution is seen best in cut 33, a detail taken from a small paddle-shaped implement whose terminal is represented in cut 19. In consequence of irregularity in the carving, and by reason of the angles which are formed by elbows and knees, the arms and legs approach so as almost to touch each other. The likeness to cut 32 is thus lessened, but it remains incontestable.

Should any doubt be felt as to the connection of this ornament with the foregoing type, it ought to be completely removed by the ornament on a staff in the Museum at Munich, represented by cut 34 *a*. On the summit we see the well known female figure represented in two images which turn their backs to each other. Beneath the triangularly arranged "sharks' teeth" pattern, runs a band where our motive appears with clearly marked bodies of about the same breadth as the limbs. Here, consequently, the trunk is not yet quite reduced to a sharp ridge. It is also retained in the upper field of the succeeding broad band; whereas, in the lower field, we find the figures still clearer (cut 34 *b*.), with trunks widening downwards, and also with distinct feet of precisely the same shape as in cut 29. The chief difference here is that the limbs do not fuse together as in the upper band. A minor difference is that the free fore-arms are stretched upwards in a natural way, and the free shins point slightly inwards. We have, consequently, two stages of development here represented on the same object! This highly interesting ornament is, so far as I know, the only one any European Museum possesses. It was this very staff which, in 1881, gave me the clue to the explanation of Hervey Island ornament. Immediately afterwards I received additional corroboration from the scoop in the Basle Museum, with its unique ornament.

The identification of the following conventionalised figures becomes now comparatively easy. We find the same form as in the upper band of the Munich staff on an elaborately carved lance in the Christiania Museum, alternating with "thigh patterns" and "sharks' teeth." On the "paddle" blades (cuts 12, 13, 15), it is seen covering large surfaces divided into fields of varying size, yet with the trunk always reduced to a sharp ridge.

But as before mentioned, it is on the axe shafts that this ornament undergoes its greatest transformation. A good example is presented by a round axe shaft in the Museum at Neuchâtel, the lower end of which is figured in cut 36. Upon *a.* we find the ornament a little more extended than before, and the limbs increase rather in breadth towards the points of union. Upon *b.* occur isolated figures separated by the quadrangular holes, or so called "eel-borings" *(ai-tuna)*,[1] which are so often bored through axe shafts. Lowest down in the border of the shaft is a row of free-standing, four-sided projections, formed by the same process. Upon *c.* we find our pattern but, considerably modified, it is disposed in three rows. Here the fusion between arm-curves and leg-curves is so complete that legs and arms are formed by uninterrupted crossed lines enclosing regular chequers within which we can still always recognise the rudiments of the trunk—that is, the elevated sharp ridge, which in the drawing appears merely as a slender line. The metamorphosis is enhanced moreover by the fact that the somewhat broad lines which are used to separate the different bands are here reduced to sharp horizontal ridges, which are exactly like the vertical trunk-rudiments.

On the same implement we find the phase *b.* of the foregoing drawing covering the whole remainder of the round shaft. The isolation of the figures is here (cut 37) obtained, not by such large quadrangular "eel-borings" as on the lower end of the shaft, but by parallel furrows which run along the whole length. These furrows are called, according to Wyatt-Gill, "clefts" *(kavava)*. On the crescentic surfaces fashioned beneath the anterior mouth

[1] W. GILL, *Jottings*, etc., p. 223.

of the groove into which the stone axe is fitted, we find, on this axe shaft, an example of how the same ornament shows itself when transferred to a surface with a curvilinear outline (cut 38).

In cuts 39 and 40 we have a further illustration of the technical carrying out of this ornamentation. Cut 39 is exactly like cut 36 *c*. Cut 40 shows a new form of development. Here the different figures are separated from each other, but each figure's elbows and knees have fused together, so that the extremities form regular free quadrates round about the trunk, which is reduced as usual to a sharp ridge. Of course, the fore-arms and legs on all such amalgamations disappear. The horizontal separating lines between the bands are also reduced to ridges.

In cut 41, which shows the ornament on the lower quadrangular portion of the shaft of an axe in the Chambéry Museum, we meet the same motive as in cut 37. The trunk, however, has become so shortened, that the terminations of the limbs almost run together and enclose rhombical spaces separated by the usual dividing lines, and these are curtailed also. Recognition is made somewhat difficult because the figures are represented in a horizontal position, so that the fragment of what is, in truth, the horizontal boundary line between the bands, stands vertically. Placed together in double rows, this pattern forms nine cross-bands on the lower quadrangular portion of the axe shaft. Between each pair of such cross-bands, we find two large quadrangular "eel-borings," thus making eight pairs on each side of the axe shaft. The intervals between these "eel-borings" show a new ornamentation, consisting of "sharks' teeth" placed in rows one over the other in such manner that the point of each tooth is inserted into the base of that standing next above. This ornament recurs even on the upper octagonal portion of the same axe shaft. It seems to be rare. I possess only one other example, from a round axe shaft in the Armeria Reale (No. 17) in Turin. The latter is said to come from Mangaia; the Chambéry axe is from Tahiti.

The last degree of dissolution of the ornament motive, with whose degradation we have hitherto occupied ourselves, is perhaps

that stage where only limb-chains in the form of zigzag bands remain, and are crowded close together so that their angles re-enter each other, as on the before mentioned spear at Christiania (cut 42), and also in the uppermost and lowest bands on the drum ornament (cut 28). Zigzag lines, either with or without alternating straight ones, often occur spread over large surfaces, as on the blades of paddle-shaped implements in the Geneva (K. 124) and Basle Museums, &c.

It is not my wish to assert that no zigzag pattern exists which has not been developed from the long series we have traced, all the less as it certainly is a common Polynesian device. But when it occurs in the midst of an ornamentation whose consecutive and regular development is apparent, and when it can easily be deduced from this motive, they are theoretically entitled to be placed together. Besides, an ornament may have more than one source. It often happens that when a series of developments *approaches* a certain well-known geometric motive, it quite simply incorporates the latter by reason of this relation. After such an incorporation has taken place, it will be difficult enough to decide to which of the two divisions an ornament properly belongs.

The history of another zigzag pattern is easier to determine. It is that which we meet with on the long delicately-carved head of a wooden lance in the Museum at Boulogne (cut 43). In accordance with what is suggested by a rather more coarsely executed carving on the colossal head of a lance in the Munich Museum (158 cm. long, 15 cm. broad, No. 731 C.), the Boulogne ornament must be derived from the running together of arrow-like incisions, which again are no more than varieties of the familiar crescents or "thigh" patterns. In fact, this pattern corresponds in its origin with the zigzag pattern of the Christiania Museum (cut 42), for both depend on a conversion of the limbs, though the path of transformation is different. Even the motives pictured in cuts 53 and 55 ought probably to be referred to this form of development, and the incisions on the blade of the Douay club itself (cut 54.—See drawing of details).

It ought to be clear from all the foregoing representations that I assert no chronological signification at all in the history of these developments. On the material known to us, phases the most remote from each other in order of development occur even on one and the same implement. To distinguish between earlier and later objects, one has no other guide than an appeal to the workmanship which here, as elsewhere in the world, deteriorates in proportion as a foreign civilisation gains ground. Objects carved with a shark's tooth are, it may be added, not very difficult to distinguish from those fabricated at a later period with iron knives. The ornament even on these last mentioned still maintains itself with a wonderful tenacity, showing what vitality a firmly rooted ornamentation may possess.

In one instance I can demonstrate how modern influences have wrought changes upon our proto-motive itself—the grotesque female figure with which our researches have made us acquainted. In the Ethnographical Museum of Copenhagen, is to be seen a paddle-shaped implement with a flat shaft-head, on one side of which (cut 44) we find a row of four female forms, evidently representing our original type in modern garb. The "paddle," which was bought from the King of Rimatara,[1] bears the inscription—ATOPA (probably the name of the owner), of which one syllable is engraved on each of three of the figures. On the fourth is the date—1846, referring, consequently, to a time when Christianity was already rooted in these islands.[2] At first sight, one might readily imagine that the garments of these women consist of a gown with a wide jacket; but as such a dress, so far as is known, never occurs in Polynesia (the "European" costume everywhere introduced by the missionaries being a wide blouse falling to the feet—not tied round the waist), it is more probable that what here looks like a gown, is only the piece of cloth, *parēu*,

[1] By mistake this object in the Swedish and German editions of this paper (*Ymer*, 1890, p. 228, and Mittheilungen der Anthropologischen Gesellschaft in Wien, 1892, Bd. XXII., p. 43,) has been referred to as *Raivavai*.

[2] Protestant Christianity was introduced by Tahitian missionaries to Rurutu, Rimatara, and Raivavai in 1821, to Tubuai in 1822, and to Oparo in 1825. MEINICKE, *Inseln des Stillen Oceans*, Leipzig, 1876. Bd. II., p. 199.

wound round the hips, and reaching to the ankles, which in the Tahitian country, still forms the entire working-day dress of the women. Above the waist we find again the pointed breasts of the primitive figure, with the "sharks' teeth" pattern on the chest and arms, wholly as in the original type. The position of the body is changed (the missionaries were probably not fond of one that recalled the obscene *upa-upa* dances), but the arms are stretched up exactly as before. The woman furthest to the left has no apparent hands, but the other women have the three fingers represented after the old fashion. The figures are surrounded by "sharks' teeth," arranged in a manner which clearly indicates a decline of the ancient style. On the reverse (cut 45) are four male figures clad in modern European guise, the shirts outside the breeches. Curiously enough, the ornamentation on the upper portion of this object shows no remarkable deviation from the old type. The quadrangular shaft is adorned with "eye-patterns," and the blade shows exactly the same grouping of the ordinary motives as in cut 12. All that can be said further is, that the blade is of unusual breadth in proportion to its length, so as to become nearly circular.

That the genuine ornamentation should maintain itself unchanged on a comparatively modern object, whilst the human presentment has undergone such essential variations, is not surprising. The human form, especially when it has lost its religious significance, must follow the changes of the times. The conventional ornamentation on the other hand, whose ancient significance had perhaps already waned, even if it was ever at all understood by others than the "wise men" who made the implements, could be maintained without objection; it was not contrary[1] to the new order of things.

[1] According to W. GILL, all idols on Mangaia, with one solitary exception, are said to have been the work of a single man, Rori. If this refers to an artificer who really existed, the tradition may explain the extraordinary constancy of the style. Numbers of objects do actually give the impression of proceeding from the same hand. Perhaps the secret of the ornamentation was never fully known by any others than its inventor and a select few.

Polynesians cling tenaciously to ancient customs, though often they are no longer capable of accounting for their original meaning. I have myself had the opportunity of ascertaining to what an extent the old heathenish burial customs, for example, are kept up, despite a flourishing Christianity.[1] If one asks the reason of a device or a custom, one usually gets no satisfactory information. Forgetfulness is ONE factor; the natural and common unwillingness to disclose to Europeans the real meaning of these ancient representations is another. Should anyone, therefore, to-day, ask a native of these islands whether the ornamentation here delineated has any significance, and the reply should be "no," I could not recognise in it any decisive evidence. Our previous investigations suffice of themselves to prove that the forms of development of the old primitive images, highly conventionalised, *must* have a symbolic significance. They symbolise, they stand in place of, the primitive image. They are to be considered as a sort of cryptograph. By means of perpetual reiteration of certain ornamental elements, they suggest the divinity to whose service the decorated implement was in some way dedicated.

It is not the first time I have expressed what may appear, to many persons, a hazardous opinion. It was first brought forward in a discourse before "la Société des Sciences Naturelles de Neuchâtel," on April 21st, 1881, immediately after my having met with some very important ornamented implements in the Museums at Basle and Munich. The report, however,[2] otherwise pretty complete, fails to apprehend just this point. On April 24th, 1882, I delivered a summary of the subject before our Anthropological Society. The question was treated anew in my paper, "Sur l'Art Ornementaire des Peuples Américains," at the Fifth American Congress in Copenhagen, on April 24th, 1883, and I permit myself to quote the following from the *Compte rendu* of the Congress, printed in 1884, page 322 :—"M. Stolpe fournit un autre exemple, en appelant l'attention sur les ornements linéaires bien connus,

[1] *Ymer*, 1888, p. XIII.

[2] *Bulletin de la Société des sciences naturelles de Neuchâtel*, 1881. T. XII., pp. 306—309.

gravés pour fournir des ex-voto sur les manches des cognées en pierre de l'île de Mangaia (groupe Herveïen), ces ornements devant, comme [le prouvent] les gravures qui se trouvent sur un grand puisoir dans le musée de Bâle, pour la plupart être regardés comme des figures transformées d'êtres humains' ou plutôt d'êtres divins." . . . [1] The complete harmony between my conception of the question at that time, and the surprising confirmation of it found in the country itself and published two years later, 1885, by the Rev. WYATT-GILL in his *Jottings from the Pacific*, is thus exhibited. Mr. Gill resided as a missionary for 22 years on the Hervey Islands, and it is to him our thanks are mainly due for what we know of the religious ideas of the natives. His evidence is too weighty not to be quoted in full. It is under the heading [2] "Stone Adzes in the Pacific."—"The adzes of the Hervey Islanders are frequently hafted with carved *pua* wood. The carving, which is often admirable, was formerly executed with sharks' teeth, and was primarily intended for the adorning of their gods. The fine-pointed pattern is known as 'the sharks' teeth pattern' *(nio mango)*. Other figures are each supposed, by a stretch of imagination, to represent a man squatting down *(tikitiki tangata)*. Some patterns are of recent introduction, and, being mere imitations of European designs, are destitute of the significations which invariably attached to ancient Polynesian carving. The large square holes are known as 'eel-borings' *(ai tuna)*; the

[1] Another interpretation of Hervey ornamentation has been propounded in America not long ago, according to which the devices on the axe shafts are simply an imitation of the regular binding with fine twists of cocoa-nut fibre whereby the stone axe is fastened to the shaft.—W. H. HOLMES, *A study of the textile art in its relation to the development of form and ornament.* Sixth Annual Report of the Bureau of Ethnology, 1884—85, Washington, 1888, pp. 189—252 (*vide* pp. 249, 250). This paradox, so curious when compared with its author's otherwise excellent treatment of the ornamental question, demands probably no separate refutation.

[2] WYATT-GILL, l. c. p. 223. The citation is quoted also by GIGLIOLI, *Notes on a remarkable and very beautiful Ceremonial Stone Adze from Kapsu, New Ireland.* Internationales Archiv für Ethnographie, 1890, p. 182, in which GILL'S explanations have been considered in treating the axe shafts from New Ireland so fantastically adorned, yet with fairly naturalistic figures of men and animals. It is indeed more than probable, that these axes and the fantastic sculptures in general from New Ireland and New Britain, have a religious significance.

lateral openings are naturally enough called 'clefts' *(kavava)*. To carve was the employment of sacred men. The national gods of Mangaia, with one exception, were carved in ironwood by one man, Rori, who was believed to have been specially assisted by the gods for the purpose. The idols were called 'carvings' (*tiki* in the Hervey group, *tii* in the Tahitian and Society groups)."

From this evidence it follows :—

1. That the carved ornament in Polynesia *always* had a meaning.
2. That the carvings were executed by "sacred men," of whom *one* is known in connection with Mangaia, Rori, who, with the help of the gods, is said to have made *all* the divine images of that time with one exception.
3. That the ornament in question originally appears on the images of gods.
4. That this ornament always involves the image of "a man squatting down." According to W. Gill it is further intended to represent "*Tiki-tiki tangata.*"

That there may be no doubt as to what ornament Wyatt-Gill means, it must be recollected that he speaks exclusively of *axes*, and that upon them no ornament ever occurs but those shown in cuts 32 and 36—41.

It is to be regretted, however, that Mr. W. Gill's exposition does not clearly indicate whether the figures named *Tiki-tiki tangata* are to be interpreted as representations of several separate beings, or whether they are manifold images of one and the same individual divinity. In case the second alternative be admitted, the divinity can hardly be other than *Tiki*, who is supposed to be ruling at the entrance of the subterranean paradise. The added *tangata* (man) seems to confirm the identification, because it is exactly this *Tiki* who in certain places is considered to have been the first man, the first who was raised to the dignity of a god. That this *Tiki* is on Mangaia considered to be a woman, explains the female type in the less transformed figures.

Now what were these axes, whose shafts seem to be so thoroughly unfit for practical purposes? According to the account on the label[1] of an axe of this kind in the Museum at Chambéry, No. 521 (comp. cut 41), it is said that the stone axe itself had belonged to a chief of Tahiti[2] in Cook's time, and it *was, after the owner's death, shafted in this manner that it might be preserved by his family as a remembrance.* It was afterwards presented to a French officer who had chanced to do the family some great service. Hardly any Museum has even so much as this history to illustrate these remarkable objects, which are found in almost every collection. The internal probability of the story confirms the truth of the account. "Ancestor worship" is a characteristic feature of Polynesian religion. The souls of the departed become the guardian spirit of the survivors. Their worship demanded a visible form, under which offerings could be enjoyed by them, and this was found sometimes in the skull itself of the deceased, which was preserved in the house, sometimes in some article of his property. In the latter case, scarcely anything could be more suitable than the stone axe, which was the deceased's most important implement, and which it required so much toil to make. On the Hervey Islands the transition was easier, as there the stone axe itself is considered as a god.[3] Even the fine plait of cocoa-nut fibre with which the axe is fastened to the shaft was a god, and the method of binding it had, on Mangaia, been taught by the gods. Both during the operation of plaiting and during the decoration of the axe shaft, songs were sung in a low voice to the gods, that they might further the work.[4]

[1] ADDITIONAL NOTE. I understand that this important label has been lost.

[2] "Tahiti" seems in some museums to have been formerly used as a general name for all the southern part of central Polynesia.

[3] GILL, *Jottings*, page 224. It is added: "The shape of a god-adze differed *at the back* from those used by artisans, in being rounded underneath."

[4] The following myth may serve to elucidate the sacred significance of the axe:

"The first house on Mangaia was built by Rauvaru, who slept in it as soon as it was finished, the long thatch ends hanging loosely down. A heavy shower of rain fell, causing the thatch to lie smoothly. Now Rangi greatly admired this new invention of house-building, but thought he

The god who taught the Mangaians to make axes and to fasten them on the shafts with cocoa-nut fibre plaitings, was called *Tane-mata-ariki* ("Tane-of-royal-face"), and he is the real "axe god." In the *Eva-toki*,[1] or "axe dirge," his weapon is extolled as *Toki ia Iti*, "the axe from Tahiti." Tane was honoured under the symbol of a triple axe, which betokened the three priestly families on the island, without whose aid the gods could not be worshipped aright. This triple axe was one of the few sacred symbols which were not delivered up to the missionaries, but were hidden in a mountain cave. No one, however, has succeeded in finding any trace of it.[2] This is what the myths tell us concerning axes.

could improve upon what Rauvaru had accomplished. He therefore descended to the shades (Avaiki) to pay a visit to his grandfather Rongo, who presented him with a wonderful axe, the handle and all being of stone in one piece, and withal very sharp. During the rain Rangi came up unobserved from the shades and trimmed the thatch of Rauvaru's house all round. Great was the astonishment of the owner in the morning. . . . . The magic axe, Ruateatonga, became the envy of men and the gods too;—when Rangi died it disappeared for ever."—
W. W. GILL, *Myths*, pp. 273—4.

[1] The funeral games, "*eva*," prescribed by Veêtini in honour of the dead, which were performed some months after the decease, were according to WYATT GILL (*Myths*, pp. 271 and 181) of four kinds:

I. *Eva tapara*, when the mourners blackened their faces, shaved their hair, and clothed themselves in evil-smelling garments of *tapa*, which were first dyed red in the juice of the *kukui* nut tree, and then dipped into the black mud of a *taro*-patch, which made them stink like a decaying corpse.

II. *Eva puruki*, the war dirge. Long spears wrought from white brittle wood were used. The mourners divided into two parties, and after an animated introductory conversation between the leaders, war-like evolutions were executed and songs were sung, praising the dead and the heroic deeds of his clan. It is in these songs that the history of the islanders must be sought.

III. *Eva toki*, the axe dirge. In this, mimic axes entirely of iron-wood were employed, as the use of stone axes would, in the excitement of the actors, infallibly lead to bloodshed. With these, amid floods of tears, they clove the cruel earth in hope that the spirit of the departed might return through the opening. This ceremony was celebrated only in memory of deceased artificers.

IV. *Eva-ta*, the crashing dirge,—when each member of the two supposed armies is furnished with a "flat spear or wooden sword a fathom long." This differs from the war-dirge, in the weapons used and in the style of composition. GILL's account gives no clear idea of the order of the ceremony. For us it has a peculiar interest, since it is possibly connected with the form of the club, cut 56, as *Eva toki* possibly is with the mythological meaning of the axe.

[2] GILL, *Jottings*, p. 424.

Now were these axes, whose ornamentation we have been considering, consecrated to *Tane-mata-ariki*, or were they representatives of the departed ancestor to whom the tribe owed divine honour? I incline to the latter opinion, and thus follow the indications given by the Chambéry axe. The assumption that the shaft ornamentation symbolises *Tiki*, mistress in the kingdom of the dead, is easily reconciled with this interpretation. It is singular that the kind of wood, *pua* (Fagræa Berteriana), of which axe shafts are made, is connected with the "shades"; it is from its branches that the spirits of the dead go down to the under-world.[1]

From these researches, it appears to me to follow, that the peculiarly-shafted stone axes of the Hervey Islands have a religious signification, that they are especially connected with ancestor worship, and that they were probably the very symbols under which this worship was performed. The great numbers of similar axes in the European Museums show that their owners had no particular hesitation in parting with them. This cannot excite any surprise when it is understood that the Polynesian was not an idolater in the sense that he considered the image to be itself a god,—it was for him merely a symbol, in which the divine being on certain occasions could take up his abode. Even Cook relates with what indifference people looked on when he took possession of sacred images, and how these were disgraced and derided in order more plainly to make it manifest that they, in and for themselves, were not at all divine.

The interpretation of the *paddle-shaped implements* offers greater difficulties. That these elegant implements, entirely covered with sacred symbols, should be designed for ordinary profane use, appears to me, *à priori*, inadmissible. Beyond question their shape corresponds in essentials with that of the ordinary paddles in these regions; but their extremely rich carving, and their comparatively weak structure, make them evidently still less

[1] GILL, *Jottings*, p. 190: "Its long branches being regarded as the road by which the spirits of the dead descended to Hades."

suitable for practical use. Moreover, many of them are too small for such a purpose. One example, in the collection of the Royal Swedish Academy of Antiquities (Eugénie collection, No. 2123_{20}), measures only $69_{,5}$ cm. in length, of which the blade itself is $28_{,5}$ cm., and I have seen smaller ones. The longest may exceed two mètres. If we examine their shape more closely, we find two principal types:—the *straight*, where blade and shaft lie in the same plane; and the *bent*, where the blade forms an angle of about 15° with the shaft. To the former group belong the larger, to the latter the smaller "paddles."

The shape of the shaft-terminal, whether it is conical, or flat and rectangular, is probably without significance—the ornamentation in both cases is the same—nor is there any significance in the shaft being four-sided or round. A more important matter is that the shaft is sometimes double, consisting, in fact, of two parallel shafts, united above by a flat piece resembling the usual rectangular, flat shaft-terminal, which provided us with so many examples of ornamental development. From such considerations it is difficult to regard the implement with any certainty as a "paddle."

The form of the blade is an important factor in deciding upon the intention of the implement. It is usually egg-shaped, broadest at or near the middle, and pointed at both ends (compare cuts 10—15). One side is always flat or slightly concave, and the other is slightly convex. When the "paddles" are bent at an angle, the convex side always lies within the bend. Occasionally the blade is broad and nearly round (see an example in the Museum at Copenhagen, Inv. I. e. 116). A very exceptional and rare form is long-drawn and pointed, where the greatest breadth of the blade does not exceed more than one-fifth or one-seventh of the length. Similar examples occur in the British Museum (EDGE-PARTINGTON, *Album*, plate 9, fig. 3, from Raivavai), and in the United Service Museum in London, both with conical shaft-terminals. Edge-Partington delineates another shape having elongated oval blade with blunt end, and a shaft without any terminal. It is in the collection of Mr. Longuet Higgins, at Turvey Abbey, and is, so far as I can remember, unique. Of great interest is the

"paddle" from Raivavai, now in the British Museum, with a blade at either end, copied by Edge-Partington, plate 9, fig. 2. Two-bladed paddles do not otherwise occur at all in Polynesia. The richly-carved two-bladed implements mentioned by General Pitt-Rivers,[1] which are used by the fuglemen in the New Zealand canoes to beat time for the rowers, I have not seen, and no similar Polynesian implement is known to me.

It is observable that common as these paddle-shaped implements now are in European Museums, there never appears, so far as I am aware, any precise explanation of their use. The word "paddle," is everywhere supposed to carry its own explanation, however objectionable the term may be. It is true that in one Museum, at Munich, they are labelled "*Oyerhachey*," but when this very un-Polynesian-sounding name (one of the many dubious appellations employed ten years ago in that Museum) is applied even to a "paddle" from the Solomon Islands, it can only be regarded as apocryphal, and gives, moreover, in its untranslatable terms, no explanation. To call these objects, with Ratzel,[2] "clubs," is probably to choose the most unlikely of all interpretations.

Without desiring to propound any new theory touching the significance of these implements, I will, in order possibly to pave the way for a final discussion of the question, shortly notice a few of the objections which may be made against the designation "paddle."

Against their employment as paddles comes first and foremost their weak structure. Paddles from Tahiti or Poumotu, sufficiently prove what strength the Pacific Ocean demands for such a purpose. The ornamental design must necessarily altogether weaken the implement. There is, further, their variable size. Even the largest appear impracticable for rowing, whilst the smaller are plainly insufficient. Real paddles have in all cases a fixed normal length. The difference in shape (compare the two terminals of the broad paddles with the small long-pointed ones) is also an objection,

[1] LANE-FOX, *Catalogue of the Anthropological Collection.* London, 1877, p. 84.

[2] RATZEL, *Völkerkunde*, II. Leipzig, 1887, p. 154—6.

when we consider the uniformity which otherwise characterises all real paddles within other island groups. To regard the large straight forms as steering oars, is to encounter the difficulty that the surfaces of the blade are, as we saw, differently shaped, and this would make the implement less suitable for such a purpose.

As insignia of dignity for chiefs these objects could, as regards their adornment, justify such a function. But the supposition would be entirely a matter of conjecture; and as implements for marking time for rowing (as in New Zealand), though the smallest might from their length be so employed, yet all the others would be left unexplained.

It would be a better view to regard the paddle-like implements as dance accessories. Such things play a considerable part among the people of the Pacific Ocean. This supposition would furnish an explanation of both the chief types. Thus, the stronger straight types would be designed for men, and the smaller bent ones for women. Such a distinction is made in many places. Even the two-bladed forms may find an analogy in the two-bladed dance accessories of Easter Island, the so-called "*rapa*." The carved figures in *upa-upa* attitude and the ornament derived from it might then support this theory. But of this one knows nothing at all. We ought not to leave out of sight the scoop-shaped implements, which, provided with just the same sort of shaft and adorned with precisely the same ornamentation as the paddle-shaped ones, might with great likelihood be regarded as merely their variant. How this resemblance may affect the dance accessory theory, I cannot say.

To regard the scoop-shaped implements as balers for canoes leads one into just the same difficulties as the paddle theory. For them, the designation "Gabenschaufel" which I heard conferred in the Vienna Museum both on "paddles" and scoops, may perhaps seem applicable; but as no account of the original sources was at that time anywhere to be found, no thorough examination of the tenability of such an interpretation is practicable. In this connection it deserves to be related that, according to what is reported in Tahiti, one of the Easter Island hieroglyphs (the 8th in the 4th row of A. B. Meyer's copy of a fragment of picture

writing) represents a wooden implement, "whereon people in famine used to reach forth *one* batata."[1] This implement has moreover quite another form on the picture-writing tablets, a *w*, whose outermost branches terminate in a hand, and it has for our problem no other significance than to show that in Polynesia different instruments exist for such purposes, though apparently no like object has been found by the collectors who have visited the island.

Although no fully authenticated support for the designation "Gabenschaufel" can be cited, it seems worth while to take into consideration to what extent the implements in question may have been specially designed for making sacrificial gifts. Their ornament would then suggest offerings to *Tiki*. How important are the sacrifices and ceremonies (instituted according to the legends by *Veêtini*) in *Tiki's* honour, has been previously shown. Another coincidence worthy of attention is that the objects here in question are made from the same sacred Pua-wood as the axe-shafts (see above page 108).[2]

[1] A. B. MEYER, *Bilderschriften des Ostindischen Archipels und der Südsee*. Leipzig, 1881, Taf. 6.

[2] As an interesting fact, possibly tending to explain the meaning of the before-mentioned (page 109) *two*-bladed "paddle" in the British Museum, I will relate the following.—During our sojourn on Fakarava, in the Poumotu Archipelago, in 1884, I obtained a two-bladed implement which, in its shape, recalls those in question. An intelligent native, noticing that I collected all sorts of objects relating to the native culture, manufactured for me, *unasked*, an implement which he called "model of spade wherewith aforetime they buried their dead." The model, which is of the actual size, consists of a staff, with a great pearl mussel-shell fast bound to either end by cocoa-nut plaiting. The entire implement is 146 cm. long (Catalogue of the "Vanadis collection," 29, 72). It is called *Pâraunōni* (*pârau* = pearl mussel-shell—the meaning of *ōni* in this combination I do not understand). It was employed in such wise that the operator shovelled alternately on both sides with either blade. Several natives, on seeing the implement, confirmed to the full the account I had received. An object of somewhat similar shape is to be seen in the British Museum ("double-bladed implement of pale heavy wood," EDGE-PARTINGTON, *Album*, plate 39, fig. 3), but as it measures only 76 cm. in length, it probably had some other use. Its origin is unknown. I am unaware of any other two-bladed implement from Polynesia than those hitherto mentioned. It may be assumed that the paddle-shaped implements relate in some way or other to the worship of Tiki, whose conventionalised figure runs through the whole of their ornamentation, and it would not be at all surprising if, to certain of these objects, a form was given suggestive of the tool wherewith the grave is prepared. The two-bladed burial spade was not exactly limited to Fakarava, and the distance between the Tubuai group, from which the ornamented two-bladed "paddles" originate, and the Poumotu Islands is not great.

But whatever may have been the use of these objects it cannot be contested that the ornamentation here, as on the axe-shafts, is a new compound of the symbols of Tiki's figure. This follows unquestionably from the just exhibited history of development, corroborated, as quoted above, by Gill. As to the nature of the nearer or more remote connection with Tiki worship which is hereby suggested, I will not commit myself, in the absence of any certain indication, to a positive opinion.

The concentric circles which adorn both sides of the quadrangular platter with a short handle, represented in cut 16, I should wish to call "Tiki's eyes" (compare page 93), but we have no information to lead us to its interpretation. Like the objects before mentioned it is made of Pua-wood.

Concerning the great drums embellished with the same Tiki ornamentation (drawings of details, cuts 28 and 29), we possess more certain information. It may be mentioned that a kind of great drum, called "the awakener" *(kaara)*, is described by Wyatt-Gill as used in funeral ceremonies.[1] It is surely remarkable how one is led back from all quarters to this same worship of the dead! The drums I have seen have also been of Pua-wood. Drums were used even at the great ceremonies accompanied by human sacrifices wherewith now and then a kind of "general disarming" was ushered in. It was called "beating the drum of peace."[2] During the peace-period thus begun, it was forbidden to carry any weapon of war, but old men were allowed to support themselves on staves. One involuntarily thinks of the staves in the Munich Museum (cut 34).[3]

For what purpose the richly-carved wooden lances, adorned with Tiki ornaments, were employed is not known. As weapons most of them would be tolerably harmless.

As we have already seen, many obscure points in the ethnography of the island groups here treated of remain to be cleared

[1] WYATT-GILL, *Myths*, p. 270.

[2] WYATT-GILL, *Myths*, p. 293.

[3] For *sacred* staves, compare WAITZ-GERLAND, VI., pp. 391—393.

up. I cannot flatter myself I have solved a problem so intricate as the "paddle" question, but as most ethnologists seem dissatisfied with the "paddle theory," I have taken a careful survey of the reasons to be urged for and against it. The final solution can only be obtained by careful investigations on the spot, but this must be undertaken quickly. Peradventure it is even now too late.

There still remains an ornament which deserves consideration, since it doubtless exhibits a process of evolution analogous in many respects to that already discussed. The ornament is relatively simple, but its occurrence seems comparatively rare. I have, however, succeeded in bringing together examples sufficiently numerous to clearly set forth its characteristics.

In its purest form this ornament occurs in two almost parallel rows on the back of the wooden image of a god in the Munich Museum. The idol is numbered 2811, and was labelled, when I saw it (1881), "Götze aus Neu Seeland," evidently an old statement. The details of the face (the shape of the eyes, ears, and mouth), and particularly the ornament on the back, point however to the Hervey Isles as the place of its origin, and I was inclined to refer it especially to Rarotonga and to regard it as an image of *Tangarōa*.

The form of the image approaches somewhat to that shown in cut 2 from the Mission-house at Basle (No. 1122), said to be a figure of *Tangarōa* from Tahiti. Having nothing but rubbings of the details of the Munich image in my possession, I can only add that its arms are formed by slightly raised small bands of uniform breadth, bent at right angles at the elbows *(a)*, so that the three-fingered hands lie near each other, below the breast.

In cut 46, the blackened arm indicates that portion of the carving which is in the highest relief (the fore-arm is shortened in the drawing for want of space); that portion which is marked with lines, including the ornament, represents a lower plane; and the white part signifies the third or deepest plane. We consequently see that the ornament begins immediately behind the

shoulder and continues down toward the hip, and this is the case on the left as well as on the right side of the body. This decoration is constituted by six human figures fused together. Their appearance can be best studied by comparison with cuts 47 and 48, two sacred symbols from the Museum at Lille.

No. 47 is of brown wood, flat and thin. The part marked black in the cut is the most in relief, the lined triangular spots indicate the hollows. A twist of cocoa-fibre is wound about the lower part, allowing a long piece to hang down free, and this is decorated with tufts of the fibre and red feathers.

No. 48, likewise of brown wood, is somewhat more intricate. The ornaments marked black are in relief; the lined part at the upper end is lowest, consequently the top on our sketch is drawn only in outline. The triangles in the border are perforated. On the handle is first a binding of bast, and then another of cocoa-twine, of which a piece 108 cm. long hangs down, just as in cut 47, and is adorned with red and yellow feathers. A human front tooth is thrust inside the bast.

No information could be obtained as to the origin of these objects. They belonged to a larger collection of sacred symbols which are obviously from the islands south of Tahiti, most probably from the Rarotonga group. Besides, the resemblance between their border decoration and the rows of ornament in cut 46, render it likely that they represent the same divinity. In cut 47 we find the characteristic figures repeated in the edge eleven times on the left and ten times on the right side. In cut 48 the figure is more obscure, but it occurs at least four times on each side. It seems to me that in this ornament we have to do with the rudimentary traces of highly conventionalised human forms. The persistency of these signs, in themselves so incomprehensible, suggests such a possibility. No manifest prototype from which they might with certainty be derived has yet been discovered. Two hypotheses may be propounded in the hope that they will lead some one to produce the "missing links" which probably lie hidden in some collection without their significance being as yet understood. Of these hypotheses, that which I here name the

first, although I do not at all regard it as the most plausible one, is founded principally on a curious sacred symbol in the Munich Museum, here represented by cut 49.

This idol consists of a piece of brown hard wood, 74,5 cm. long, having at the summit a large head flattened laterally, under which are six small figures in a row. The large head is remarkable for its great eyes and mouth, and for the sharp angularity of its front. Below the head, on either side, is a short arm, serrated at the outer edge and furnished with a three-fingered hand. A peculiarly conventionalised little figure juts forward from the middle of the arm, turning its full face to the spectator. The following figure, whose face is in profile, has its arms and legs out-stretched and bent at such an angle that the elbows and knees touch each other. A phallus-like projection is seen under the chin. These two kinds of figures alternate with each other, so that three of each kind are found on the object. They are exactly the same on both sides, and as all the figures are free-standing and are connected together only by the out-stretched limbs of the profile figures, the work is open. This object has evidently been longer and has been cut off below, probably for decency's sake.

Another specimen, likewise mutilated, of the same image, is shown furthest on the right (by the side of No. 5) on the plate borrowed from Ellis (see cut 3). Another is in the Ethnographical Museum in Copenhagen. They all resemble each other in every essential.

A counterpart to these images is found in a figure from the Mission-house Museum in Basle, represented in cut 50. The only difference is that this example, which is unmutilated, forms a long staff, with two small figures (the one full-face, the other in profile) close under the large head, and two small profile figures near the lower end of the staff, which terminates in a phallus. The long space between the pairs of little figures was probably rolled round with *tapa*, in the same way as a similar idol delineated in WILLIAMS' *Missionary Enterprises* (Ed. 18, London, 1840, p. 31), and in accordance with his drawing, tapa-bandaging is indicated

in our own illustration.[1] A similar one, without tapa-clothing and likewise with an ascertained history of origin (Rarotonga), is also to be found in the British Museum, and is drawn by Edge-Partington, plate 23, fig. 6.

Now what divinity do these idols represent? No one probably knows with certainty. The missionaries who burned multitudes of these figures, did not always take care to notice the names of the gods over whom they had won so easy a victory. That Rarotonga was their place of origin is undoubted, for the London and Basle accounts agree in this. The title-vignette of Williams' often cited book shows the natives of Rarotonga carrying numbers of evidently just such images, and laying them at the feet of the missionaries. Should I venture to attempt to interpret these figures, I should proceed from the following facts.

On examining the contents of the tapa-bandaging, *red feathers* were found. These suggest *Tangarōa*, to whose lot, as we remember, all red things in the world fell. *Tangarōa* is the "father of the gods," says a myth. In this aspect we see him on the plate borrowed from Ellis (cut 3, fig. 2), with a multitude of small gods ("children") placed here and there on his body and his back. Even the different parts of his face, the eyes, nose, ears, &c., are formed by similar little gods. The back, besides, is made with a loose lid which can be lifted off, and when this was done for the first time, the body was found to be hollow, and in the cavity lay a multitude of other small gods. The figure (109 cm. high) comes from Rurutu[2] and is now in the British Museum, which also possesses one somewhat smaller "from Rarotonga,"

[1] The form of the bandaging must have suffered since then, for on the arrival of the idol in England in 1830, "His Britannic Majesty's officers, fearing that the god should be made a means for defrauding the king, very unceremoniously took it to pieces; and not being so well skilled in making gods as in protecting the revenues, they have not made it so handsome as when it was an object of veneration to the deluded Rarotongans." All that was met with, however, proved to be *red feathers* and a necklace of cockle-shells which represented the god's *manava* or soul. The image is now in the British Museum, and is in its present shape figured by Edge-Partington, plate 21, fig. 6, as "The national god of Rarotonga."

[2] WILLIAMS, *Missionary Enterprises*, p. 12.

with three little figures on the breast and a pair on the arms.[1] The features of the latter's face agree completely with the idols in cuts 49 and 50, both furnished with several small figures. The red feathers under the tapa-bandage, and the little figures placed on the idol, make it probable that even cuts 49 and 50 represent *Tangarōa.* We remember how *Tangarōa*, after his voluntary banishment from Mangaia, took up his dwelling on Rarotonga, where he admittedly became chief god, and the type represented in cut 50 seems to have been one of the commonest occurring on that island. For instance, on one occasion, with a surprising celerity due to religious enthusiasm, the natives brought to another converted Rarotongan, fourteen colossal idols of this kind, the least of which was 5 yards long, and surrendered them to the missionaries who caused part to be destroyed and, curiously enough, employed others as decorations on the rafters of the Christian chapel they were building.

Although not deducing the ornament in cuts 46—48 directly from this *Tangarōa* figure, as I should wish to call it, I cannot omit to set forth certain analogies. If we imagine, for instance, the small figures in cut 49 divided by a line which goes through the touching points of elbows and knees, the remaining lower halves of the bodies and the legs bent at angles between them, will clearly form a motive which completely answers to the ornament in cuts 46, 47, and 48. Of such a mode of transformation we have seen an example before in cuts 26 and 27, where first the heads of the figures are seen to disappear, and afterwards the last vestiges of the trunk, even the breasts, until finally only the thighs remain. The possibility of such a mode of evolution is consequently already proved, and our ornament is thus in the same stage of dissolution as the figures in the lower field of cut 26. According to this theory, the rows of ornament on the back of the Munich figure should represent "*Tangarōa's children.*" The same would be the case with the border ornament in cuts 47 and

[1] EDGE-PARTINGTON, l. c. plate 21, fig. 3. It is much better represented in RATZEL'S *Völkerkunde*, II., p. 331, though there it is said to be from Tahiti.

48, and these last named objects themselves would thus be nothing less than symbols of *Tangarōa*. For this supposition analogies are not altogether wanting. Ellis gives (cut 3, fig. 3) a *Tangarōa* symbol in the shape of a sort of club, broad and flat in the upper end and adorned with carvings, among which there can be made out on the summit three figures in human form, and along both side edges three other figures, the two undermost turned head downwards. It is probable that these figures are in some way akin to the border ornament [1] of cuts 47 and 48. The club-like shape of this *Tangarōa* symbol is meanwhile in itself of sufficient interest, as it in some measure manifests a certain agreement with cut 47 and 48, and shows in what various forms this god could be fashioned. If Ellis' statement that the symbol represents *Tangarōa* is correct, then it seems probable that the club-like symbols drawn by Edge-Partington (plate 23, fig. 4 and 5) should be so regarded also. The club-like object (fig. 5) appears in the drawing [2] to have on its four sides an open-work ornament like that represented in cut 46, and therefore closely agrees with the symbols shown in cuts 47 and 48.

The *second* hypothesis for the interpretation of our ornament, is, on the whole, simpler, but the material for comparison on which it ought to be based, is not yet sufficiently abundant and requires, moreover, satisfactory illustration.

According to this theory, I should consider that the "missing link" is to be found in the "slab of wood with central rib and edges, carved to represent human figures," delineated by Edge-Partington, plate 24, fig. 4, here represented cut 51.[3] The object,

[1] This idol is figured also by RATZEL, l. c. II. Tafel "Polynesische Waffen und Schmucke," fig. 11. EDGE-PARTINGTON, l. c. plate 22, fig. 4. *Vide* Appendix, p. 127.

[2] ADDITIONAL NOTE TO THE ENGLISH EDITION.—After the issue of my Swedish original, a more correct reproduction of this very object has been published by Mr. CH. H. READ in his valuable treatise: *On the Origin and Sacred Character of certain Ornaments of the S.E. Pacific* (Journ. Anthrop. Inst., Nov. 1891, plate xiii., fig. H). In Mr. Read's drawing, even ornamental details are perfectly visible, which strongly confirm the views expressed above.—*Vide* Appendix, p. 127.

[3] ADDITIONAL NOTE.—A more accurate figure of a part of this object is given in the Appendix, cut 59, copied from a rubbing kindly brought to me, from the British Museum, by Dr. March.

which is to be seen in the British Museum, consists of a wooden slab, 68·5 cm. high, with concave edges and furnished with a projection in the middle of the base, whereby it can stand upright. Judging from the unsatisfactory drawing, a row of five or six figures placed one over the other, and all with bent, tightly-closed knees, runs in relief along the middle. The concave edges are adorned by an ornament consisting of highly-conventionalised figures, seemingly five on one side and four on the other, whose faces have a strong resemblance to the usual Rarotonga type (cuts 49 and 50), and whose bodies and legs, wrought in open-work, are signified by two angles pointing outwards. These conventionalised forms distinctly remind us, as regards their bodies and legs, of the squatting pairs of figures on the canoe decoration from Huahine (cut 3, fig. 6), arranged in stages beneath the evidently human figures which crown the top. What divinities may be represented in this "Sacred canoe-decoration," I cannot at present decide.

It is a pity that Edge-Partington's figures in general are so very sketchy; otherwise pertinent questions relative to the derivation of the ornament represented in cut 46 would have been already solved. It must now be left open until I have an opportunity to examine the important originals themselves. Meanwhile it is of great weight for my theory that the meaning of the border ornament on Edge-Partington's plate 24, 4, is known and acknowledged at the British Museum. Moreover, the name of the divinity symbolised by the aforesaid wooden slab has still to be discovered. It seems not impossible that here we have hit upon a *Tangarōa*. The numerous small figures which are heaped upon this object render such an interpretation by no means unlikely. Besides, it is known that the higher gods, the so-called *Atua*, were commonly represented as shapeless blocks. *Tangarōa*, as the first of them who assumed complete human form, is represented sometimes as a fully evident human figure, and sometimes as a symbol without human form, on which, nevertheless, is to be seen a nnmber of smaller figures designed for the reason already mentioned (cut 3, fig. 3).

Thus both attempts at interpretation here set forth would meet the case, and that fact is the fullest confirmation of the admissibility of the hypothesis.

At all events here probably is afforded a not unimportant contribution towards the elucidation of some of the most interesting sacred symbols which Polynesia has produced.

In connection with the foregoing remarks on the ornamentation of the Rarotonga-Tubuai province, I will avail myself of the opportunity to take up a question which, while it can scarcely be classed among the examples of ornamental development, is yet nearly connected with the discussion now about to be concluded upon the characteristic style of these islands.

It is the question of the origin of various remarkable objects in the museums in Leyden, London, and Douay.

In the National Ethnographical Museum in Leyden has long been a curious paddle-shaped implement (Inv. 61/89) whose extended elliptical blade is drawn out at the end into a four-sided spike (cut 52). The shaft, which is wrapped round at intervals with a fine plait of cocoa-fibre, terminates below in a knob with four reverted points. Near the blade the hitherto round shaft becomes quadrangular, and this part is adorned for a length of about 6 cm. with a curvilinear ornament, as seen in cut 53. The angles which these four sides make with each other are decorated with a row of incisions so that each seems as if it were toothed along the edges. Similar incisions are found even along the edges of the four-sided spike which terminates the blade, and which is itself wrapped round with cocoa-fibre plaiting, like the shaft. The thin blade has sharp edges, making the weapon — for such it probably was — in no wise unsuitable for cleaving skulls. The club is 166 cm. long, made of hard, brown, polished wood, and is very well worked. New Zealand was first said to be the place of its origin, now "Tahiti or the Hervey Islands."

An implement from "the Marquesas Islands," similar in form, but apparently without either ornament or plaited binding (134 cm. long), is figured by Edge-Partington (plate 5, fig. 4), as found in the British Museum.

A near relative of these clubs is met with in the Musée Berthoud in Douay, as shown in cut 54. The resemblance to the Leyden club is particularly strong both in the quadrangular transition-piece between shaft and blade, and in the binding of the shaft with plaits of cocoa-fibre, as well as in the four-pointed knob at its end. The edges of the blade are cut out in round, sharp-edged points, and it is covered with an ornamentation which in its whole arrangement is allied to that represented in cut 53 (see the drawing of details above cut 54). It ought to be remembered in this comparison that the deep parts are shown white on the copies of rubbings in cuts 53 and 55, while they are marked black in cut 54. The ornament in the upper four-sided part of the shaft is plainly the same as in cut 53, with the difference only that the curvilinear incisions on each side are here pointed in the same direction instead of, as on cut 53, turning towards each other. The incisions in the edges of this four-sided transition-piece are exactly like those of the Leyden club. Of the origin of the beautiful Douay club, unfortunately I know nothing. The question however, finds a solution bordering upon absolute certainty through a club—similar in all essentials—in the British Museum, here represented in cut 56.

The shape of this club accords perfectly with that of the Douay club. The dentated edge of the blade must be regarded as an unessential factor, which may be present or otherwise without affecting the character of the weapon. The London club is moreover destitute of all ornament, except the characteristic four-pointed knob at the lower end of the shaft. The material is dark-brown, hard, heavy wood. Despite the absence of ornament, and despite the straight contour of the blade, the general resemblance between this club and the Douay club is so great, that scarcely anyone can hesitate to refer them to the same origin.

The London club is, happily, accompanied by a detailed account which places its origin beyond all doubt. That is to say it was brought from Mangaia[1] by Mr. Wyatt-Gill himself, the same who in so epoch-making a manner has enlarged our knowledge of the mythology of the Hervey Islands. Mr. Gill's written note on the club runs "The ancient spade of the Mangaians, always used in a squatting posture. Also used (and intended to be used) as a club. This one has cleft many a skull."

With authentic information such as this, from so trustworthy a quarter, no doubt can remain as to the weapon's having originated in Mangaia. The first consequence is that the Douay club must be ascribed also to Mangaia. At the same time no objection can be raised against it on the ground of style. The curvilinear incisions which form the ornamental pattern between shaft and blade, may be easily interpreted as a variant of the simplest form of the thigh pattern before mentioned. The only difference is that the curved lines on the Douay club make a somewhat sharp angle. The rectilinear decoration on the blade of this club may also be regarded as evolved from the same pattern. Even the wrapping with plaits of cocoa-fibre is of regular Hervey type, and resembles that of the adzes. The distance is very short from the Douay club to the Leyden club. The end-knob of the shaft is the same, the cocoa-plaiting is the same, and the ornament on the quadrangular transition piece between shaft and blade is, in the main, the same also. The only difference is that the carved cuttings on the Leyden specimen are placed in two ranks in each field, with the convex sides towards each other. But even this arrangement we are familiar with in the genuine thigh pattern, though it is there less common. It occurs in this manner on the quadrangular shaft of a large paddle-shaped implement in the Museum at Santiago de Chile (cut 57—interesting as showing the adornment of the blade

[1] Through its origin the weapon gains increased interest, as from its size and shape it nndoubtedly represents the "flat spear or wooden sword a fathom long," used in the mourning ceremony "*eva-ta*" (see page 107). W. GILL, *Myths*, p. 273.

in an unfinished state), and also on the blade of the *Atopa* paddle (compare cut 44 and 43) in the Copenhagen Museum (Inv. I. e., 116). Though the curves are often placed in opposite directions, as in cut 14, yet ordinarily they face the same way.

Consequently, we have succeeded by the comparative method, thanks to Wyatt Gill's club in the British Museum, in vindicating for Mangaia two new types, one of which was first supposed to belong to the Marquesas Islands, and then to New Zealand. The new types help to constitute an entirely separate Mangaian style.

But in Ethnology one question evokes another. The four-pointed shaft-knobs on the clubs we have just been discussing, must not, it appears, be regarded as characteristic of Mangaian implements only. A paddle, wrought in typical Marquesas fashion, is to be seen in the Leyden Museum (Inv. $73_{,3}$), whose shaft is terminated with a very similar four-pointed knob (cut 58). A complete agreement in so pronounced a characteristic is rare in Polynesia, above all between two island groups so utterly different in respect of their ornament as Rarotonga-Tubuai and the Marquesas Islands. It almost seems as if some quite exceptional circumstance were concealed behind this, to the unpractised eye, insignificant detail, so accustomed are we to a rigid limitation of the spread of ornamental types in Polynesia, where the force of tradition is so strong. That the paddle in question is from the Marquesas Islands is certain from the tongue-shaped prolongation of the blade's point. On the terminals of the paddles from these islands, one usually finds a pair of little *Tiki* figures sitting back to back. Nevertheless, a paddle which I obtained in the Hakaui valley on Nukahiva, has the end of the shaft but slightly enlarged, flattened, and truncated, probably a modern simplification.

The occurrence of an ornamental detail so developed as the four-pointed shaft-knob, within two districts so separated as the Hervey and Marquesas Islands, deserves attention. I do not consider that the Marquesas paddle (cut 58) can invalidate a reference of the clubs (cuts 52, 54, and 56) to the same source, Mangaia. The resemblance between the clubs is, as we have seen, not limited to the form of the knob.

Two other questions of resemblance must not be left unnoticed. In the British Museum is a very peculiarly-shafted axe of wrought iron (Inv. 5. 4. 77), labelled "Low Archipelago" (Edge-Partington, plate 14, fig. 6). Its ornamentation resembles that of the Mangaian clubs (cuts 52 and 54), because all the sharp edges are finished with exactly the same kind of incisions as those on the elongated spike in cut 52, and on the edges of cuts 53 and 55; and also because angular curved incisions occur which, although differently grouped, manifest a certain agreement both with those in cuts 53 and 55, and with the blade in cut 54. Moreover, rows of dots occur. This axe is evidently a sort of votive axe, although the shape of the shaft is quite different from that of Mangaian axes. Its history demands separate treatment in connection with other obscure Poumutu questions. I have merely wished, for the sake of completeness, to mention its existence.

Another question is, what place in the system is taken by the long lances or clubs of dark hard wood, to be seen in many Museums (London, Leyden, Munich, Copenhagen, &c.), with crescentic incisions upon the edges of the long broad blades (compare Edge-Partington, plate 6, Nos. 2—4). Some of them have, in the lower end of the shaft, a sort of knob which closely resembles those in cuts 52—56, although usually more drawn out, and with the points repeated two to four times one over the other (Leyden, Inv. 16/552, 61/48, &c.). In the British Museum they are referred to Mangaia, in Copenhagen (Case 263 a.) to Tonga. and in other places to the Poumutu Islands. I am, for several reasons, inclined to agree with the locality proposed by the British Museum, I hope, however, in the future, to make this question the subject of a separate essay.

APPENDIX.

IN his excellent treatise (*On the Origin and Sacred Character of certain Ornaments of the S.E. Pacific*; Journ. Anthrop. Institute, November, 1891), my friend Mr. Charles H. Read has recently published an elaborate exposition of ornamental transformation, in certain examples drawn from the very same Island-groups that have formed the subject of my preceding essay.[1] As Mr. Read has discussed kinds of style quite different from those which form the subject of my paper, it is an evident act of courtesy on his part to protest that he somewhat hesitated to publish his investigations after he had become acquainted with my own essays. On the contrary, nothing can be more favourable to my theories than just such a confirmation gained from a material so different from mine. In fact it is very instructive to see the same phenomenon, which I have succeeded in tracing within the domain of surface carvings on axe-shafts and "paddles," manifesting itself also in "sculptures in the round," as on the fan-handles and idols that he has described. Certain differences in our views are nevertheless bound to arise, owing to the dissimilarity of the material placed at our disposal. Not only do the new types produced by Mr. Read serve to throw light on certain interesting cases, but owing to the fact that his figures are far more accurate than those previously given by others, his paper has on some points made me modify my opinions.

Thus on account of Mr. Read's delineations of various idols which I regard as belonging to what I call the *Tangarōa* type, I am now inclined altogether to abandon the first of the alternative explanations given (cf. above pp. 118-119) respecting the ornaments in cuts 46, 47, and 48, respectively, as originated by mutilation of a row of figures, similar to those in cut 49 from the Museum of

[1] The importance of Mr. Read's investigation has led me to make it an object of a more detailed analysis in *Ymer*, 1891, pp. 197—229, from which the following remarks are reproduced,

Munich. But it must be understood that I still maintain, to its full extent, my belief that such transformations are thoroughly possible. We meet with analogous cases, for example in cuts 26, 27, &c. But Mr. Read's fig. H., plate xiii., notwithstanding its manifest Mangaian character, shows such a striking resemblance, as regards construction, to the ornament alluded to, that it seems well fitted to indicate the way along which transformation has passed. But I do not regard it as the original prototype, because it is a Mangaian type, and we have here to deal with the development of a Rarotongan one. So that in accordance with my second alternative explanation (p. 119), I regard this prototype as having to be sought in a series of figures like those on the margin of the Rarotongan "slab of wood," fig. 51. I feel the more convinced of the truth of the latter theory since receiving from Dr. C. March last summer a very instructive rubbing of that symbol, made under the supervision of Mr. Read himself. This rubbing, which includes the uppermost part of the right margin of the said symbol, is here shown in cut 59. If these marginal figures are regarded as transformed in a way analogous to that occuring on the "district god of Mangaia," an ornament would be obtained strictly corresponding to that in cuts 46, 47, 48. If the material at present at our disposal does not allow a closer following out, link by link, of the transformation, we may hope that sooner or later missing links will be detected, probably hidden in some British collection. Evidently the double figure with two opposed heads (in Read's figs. J, E. and D, plate xiii.) finds its place here. It is in another respect of great importance, for it solves a problem left unexplained in my previous paper,—the meaning of the minute arrow-like elevations in cut 48, the god-symbol in the Museum at Lille. On comparison with Mr. Read's fig. C, plate xiv. and J, E, and D, plate xiii., it is manifest that they are the heads and arms of similar figures arranged feet to feet, whose lower limbs have been omitted; and the small rhombic elevation between each pair of heads is all that can be seen in the "rubbing" of the united trunks. In the absence of any copy of this symbol

other than a rubbing, I had forgotten the real shape of the ornament in question, and was compelled to leave it unexplained.

In my previous paper I have endeavoured to identify with the god Tangaroa every idol that bears on its person, either small images, more or less distinct, or ornaments which might be derived from such images. From the old Catalogue of the London Missionary Society's Museum, Mr. Read has obtained another denomination, *Taringarue*. Describing fig. C, plate xiv., he quotes from the same source the designation "the superior god of Atiu." I willingly confess my ignorance of this deity. The type, however, is undoubtedly akin to the other *Tangaroa*-images. Is the name "*Taringarue*" to be regarded as perhaps due to a variation of dialect[1] peculiar to Atiu? Or may it simply be a clerical error in the old catalogue? I should not be surprised at all if *Tangaroa* himself is hidden in this disguise. It is a problem well worthy of attention by those who may have an opportunity of solving it.[2]

As is justly pointed out by Mr. Read, some of the idols in the shape of flat boards, for example, figs. K and L, seem to be the same objects as are represented in ELLIS, II., p. 217 and 207, by the name of *Unus*, of which no further account is to be found in the text of Ellis. This want is in some measure supplied by the Tahitian Dictionary of Davies,[3] where "*Unu*" is translated by "a piece of carved wood put up in the marae on offering up a man." This information, which well accords with the occurrence of numerous skulls around the symbols, only refers, however, to the use and not to the real signification of these objects, nevertheless seems worth mentioning.

The figs. 1, 2, 3, pl. iv., which in Mr. Read's paper commence the chain of development in what I may call the *tiki-tiki* ornamentation, are of great interest for comparison, but belong, strictly

[1] The Tahitian word *Tariaroo*, a listening ear, in Hervey dialect ought to sound *Taringaroo* (compare DAVIES' *Dictionary*).

[2] I am quite well aware that a name, "*Tebuakina*," is given to another symbol showing the same *habitus* (fig. 2 on Ellis' frontispiece), and said to represent the three sons of *Rongo*; but in the (as far as I know) untranslatable form of that name, I find it useless to try any explanation of the symbol. Perhaps it would not be impossible to bring it in accordance with my *Tangaroa* theory.

[3] DAVIES, *A Tahitian and English Dictionary*. Tahiti, 1851.

speaking, to another though an allied series. Mr. Read also expresses himself on this point with a certain reservation. To me it seems very difficult to explain the ornaments in question, without such intermediate forms as, for instance, my cuts 34 b and 31. Far less "stretch of imagination" is needed for my derivation, because its material is exclusively drawn from the same kind of surface decoration as that which has to be explained, and not from a "sculpture in the round," typologically remote.

Mr. Read's figs. 6—9, although properly mere parallel illustrations of the series in question, are of especial interest. For comparison with fig. 8, taken from a Tahitian "*papahia*" (a stand on which breadfruit, taro, &c., are beaten iuto "*poe*"), I now adduce three figures of the small elevated knobs (see cut 60) adorning the blade and shaft of the before-mentioned (p. 125) lance in the Leyden Museum (Inv. 16/552). They show a strong likeness to the said Tahitian ornament, which is of the greater importance because the lance-type itself is closely allied to the remarkable spear from Tahiti, mentioned in my footnote on p. 82. That in WILLIAMS' *Missionary Enterprises* (London, 1840, p. 139, fig. 9), this type is referred to Mangaia, is, at first sight, consistent with the shape of the shaft's end, which, as already mentioned on p. 125, bears a slight resemblance to the terminals of the Mangaian clubs (cuts 52, 54, and 56). There is, however, a difference, great enough to make their common origin dubious. As I am still awaiting an important communication from Tahiti, I cannot yet come nearer to the solution of this question.

The study of exotic ornamentation has yet to receive a fixed terminology. It is highly important that from the very beginning we should be specially careful in the choice of our technical terms. Mr. Read proposes the designation "K-pattern" for the most transformed stage in Mangaian axe-ornamentation. This term seems to me somewhat inconvenient,—1st, because the ornament, in order to answer to it, must be looked at in an unnatural position (horizontal instead of upright); 2nd, because it is only applicable in cases where the pattern is mutilated by "*kavava*" or "*ai-tuna*." In addition it is borrowed from a far too foreign

circle of ideas. I find it better to name ornamental types, if possible, after their derivation and significance, and on this account I prefer the term *Tiki-tiki* ornamentation, as being directly indicative of the essence of the question. I feel the more justified in using the above appellation as it is based upon the authority of Mr. Wyatt-Gill, whose allusion to this very pattern is unequivocal. If necessary, a standard scheme of the gradual transformation might easily be constructed, wherein the successive stages could be simply indicated by ciphers.

About Mr. Read's series of transformed twin figures on fan handles (plate xii., figs. 2—11), no difference of opinion is possible. The series is clear and convincing, and Mr. Read has here made a contribution to the history of Polynesian art, which cannot be too highly estimated. I only wish to add some remarks concerning the concluding link in the chain, the so-called "*To*" (fig. 12). The description written upon the object itself: "called a To, a thing worshipped in all the islands," receives a strong confirmation from the Tahitian Dictionary of Davies, where "*Too*," as the word there is written, is translated "a piece of wood forming the body of an idol." Thus, the symbol in question not only represents, but literally *forms the body* of the idol! This invaluable statement of Mr. Read's typological conclusions also furnished the proof, if any such were needed, that the islanders were perfectly conscious of the meaning of even that utterly conventionalised form, as very likely they were also of the lowest steps in the *Tiki-tiki* style of Mangaia.

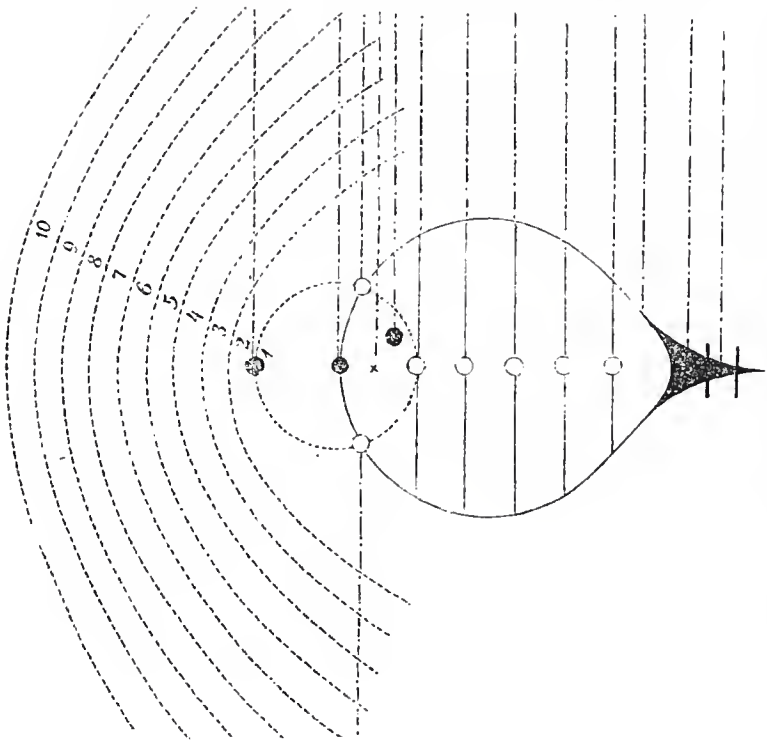
This leads me to an important matter on which I can hardly agree with Mr. Read—the question *why* such a transformation, or degradation as Mr. Read calls it, has taken place in the ornamental style of the Hervey Islands? Mr. Read, in order to explain the matter, alludes to another well-known phenomenon, that of conventionalisation by persistent copying of copies as in the design on old British coins, whereby an Apollo's head has been converted into an unmeaning series of dots and lines. Similar misrepresentations of types, evidently borrowed from Roman coins of the 4th century, are met with also on the golden bracteates of Scandinavia.

But, in the present case, the comparison does not appear to me a just one. In the North of Europe the imitators of classical patterns were not capable of, or at least did not care about, making an accurate copy of the foreign model, the special meaning of which was probably never known to them; whereas on the Hervey Islands, the original types were quite as indigenous as the derived patterns. Nor were the transformations due to any want of skill on the part of the Herveyan carver, because he often used to place on the very same implements the realistic prototype, as well as a whole series of intermediate forms down to those that are most transfigured; and this fact furnishes proof that the artificer must have been thoroughly conscious of the meaning of even the most "degraded" design. Besides, I cannot agree with Mr. Read when he says (p. 142), "The artist would unconsciously lean towards a kind of generalisation of details, which by saving his time would enable him to produce more, and naturally at a cheaper rate." Savage people never think of economising time. Time is for them of no importance, they have plenty of it, and usually they are not able even to reckon it. To conventionalise in order to save time, I presume, could hardly enter their mind. Moreover, I fear it would have been an unprofitable pursuit, and I leave it to the reader's own decision whether it would be more easy, or take less time, to carve with a shark's tooth such an utterly elaborate network as on the "paddle" blade (cut 15), or the relatively simple images shown in cuts 17, 22, 25—27, &c, No doubt there were other reasons for conventionalising, and one of the most substantial, I think, was that the higher standing types were not suitable decorations for every part of the objects to be adorned. On the "paddles" we therefore see them almost exclusively confined to the flat, rectangular terminals of the shaft. If this space did not allow more than one row of complete figures, what remained was filled up with rudiments of them, as in cuts 22—27. On the shaft the space was usually still more scanty, and on the blades the very shape of them made the most conventionalised stages to be the fittest adornment. The perception of what would be the most suitable decoration for any particular space was, no doubt, well

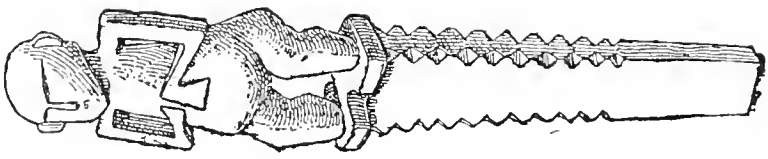
developed amongst a people so far advanced in technical skill. A desire to display as many images as possible of the god in question is unmistakeable. Moreover, an inclination to symbolism always obtains in mystic religions.

My opinion still is that the conventional ornamentation of these peoples is to be considered as the very beginning of *writing*, or rather as a kind of pictograph, possessing fixed means of expression. I do not at all maintain that every individual on those islands was able to understand such writing; but in Polynesia there existed different stages of learning, and no doubt it was fully known and understood by the "sacred men" who executed it.

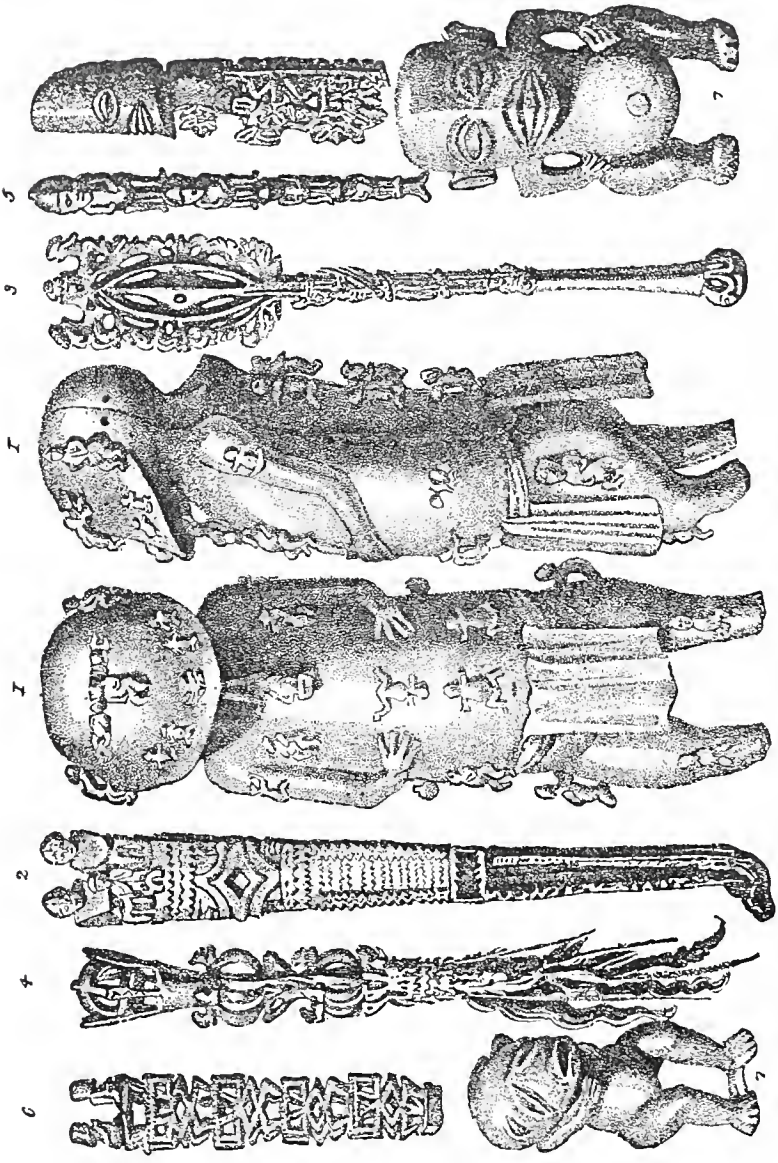
As might be judged from the foregoing, the ornamentation of savage people forms a most extensive field of research, in which the united efforts of a great number of scientists is needed, and I may count it a most valuable gain to that part of Ethnology to have obtained such an acute co-operator as Mr. Read, whose important contribution has given occasion for this postscript.



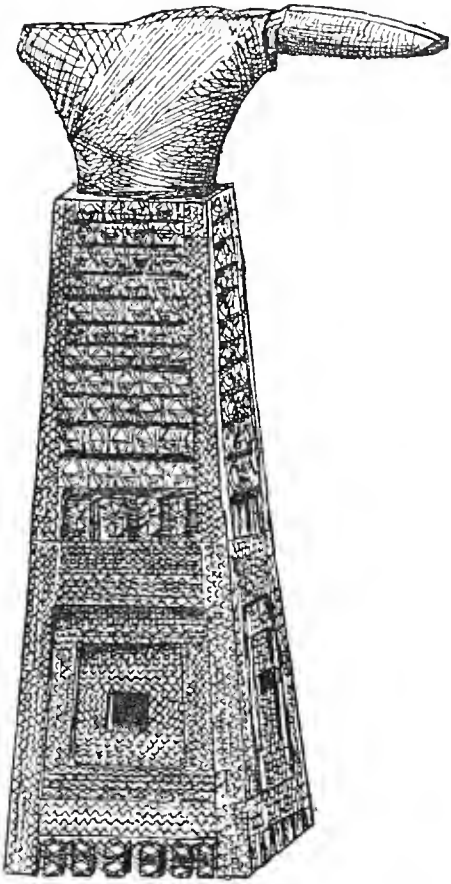
Cut I. Diagram of the Mangaian Scheme of the Universe. (After WYATT-GILL, *Myths, etc.*, p. 2.)



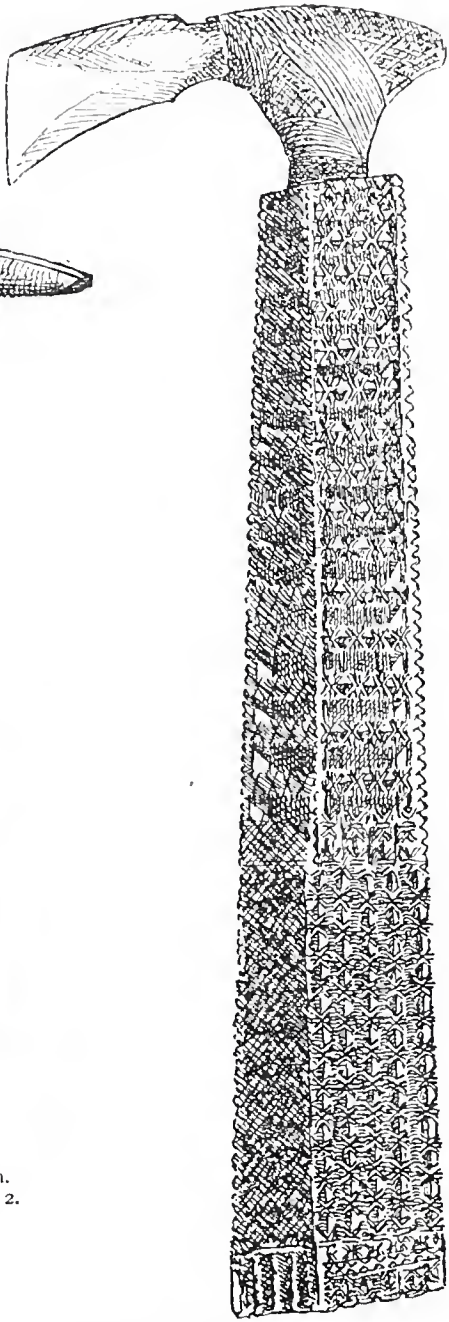
Cut 2. Wooden figure of Tangaroa, from Tahiti, Basle Mission house, No. 1122.



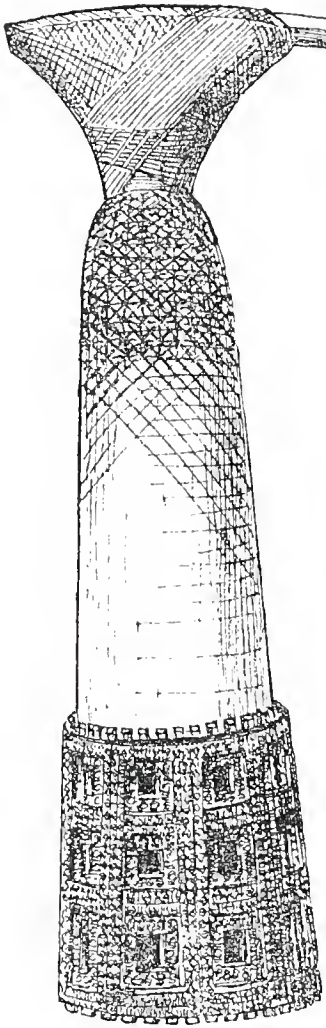
Cut 3. ELLIS, *Polynesian Researches*. London, 1829. Book II., frontispiece. See Explanation, *loc. cit.*, pp. 220—221. Fig. 1—3, Tangaroa. 2, Rongo's three sons. 5, Rongo and the sons. 6, Idol for a canoe from Huahine. 7, Oramatua. 4, This figure is not explained by Ellis.



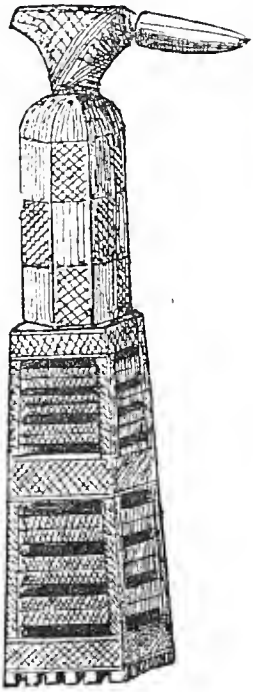
Cut 4. Axe from Mangaia.
Height 45 cm. British Museum.
After Edge-Partington. Pl. 14, fig. 2.



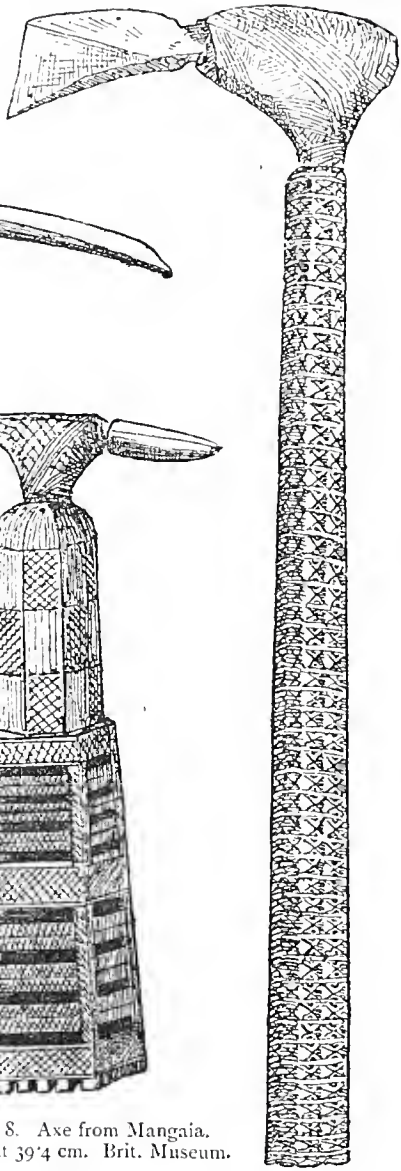
Cut 5. Axe from Mangaia. Height 76 cm.
Heape Coll. After Edge-Partington.
Pl. 13, fig. 1.



Cut 6. Axe from Mangaia.
Height 73·6 cm. British Museum.

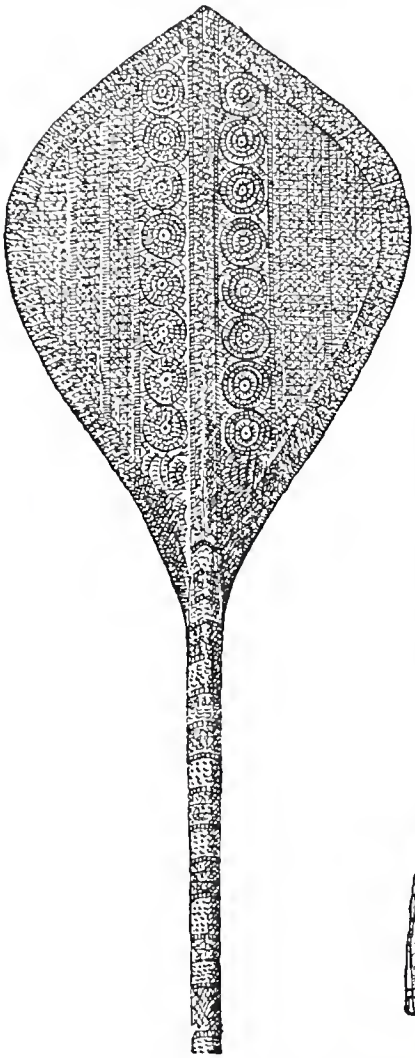


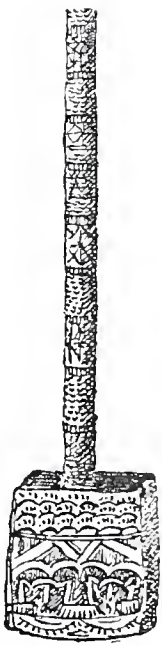
Cut 8. Axe from Mangaia.
Height 39·4 cm. Brit. Museum.



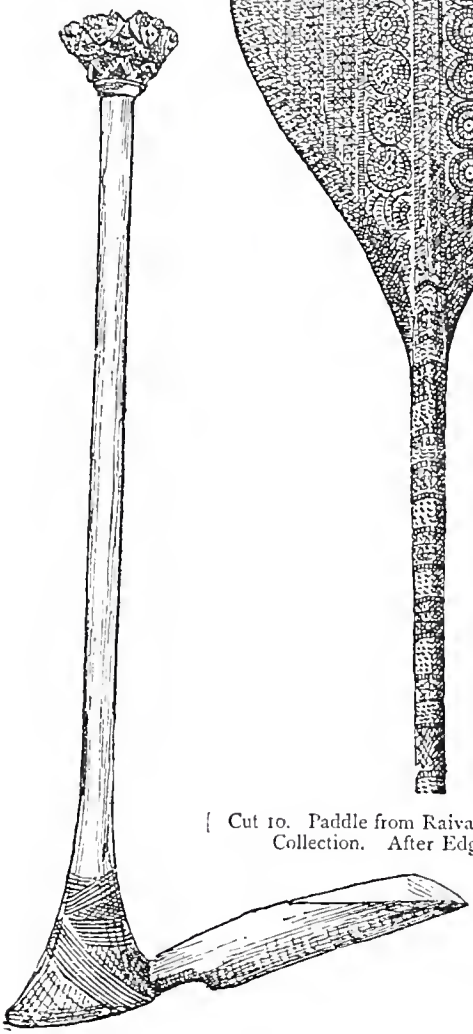
Cut 7.
Axe from Mangaia.
Height 81·3 cm.
Heape Coll.

All after Edge-Partington. Plate 14.



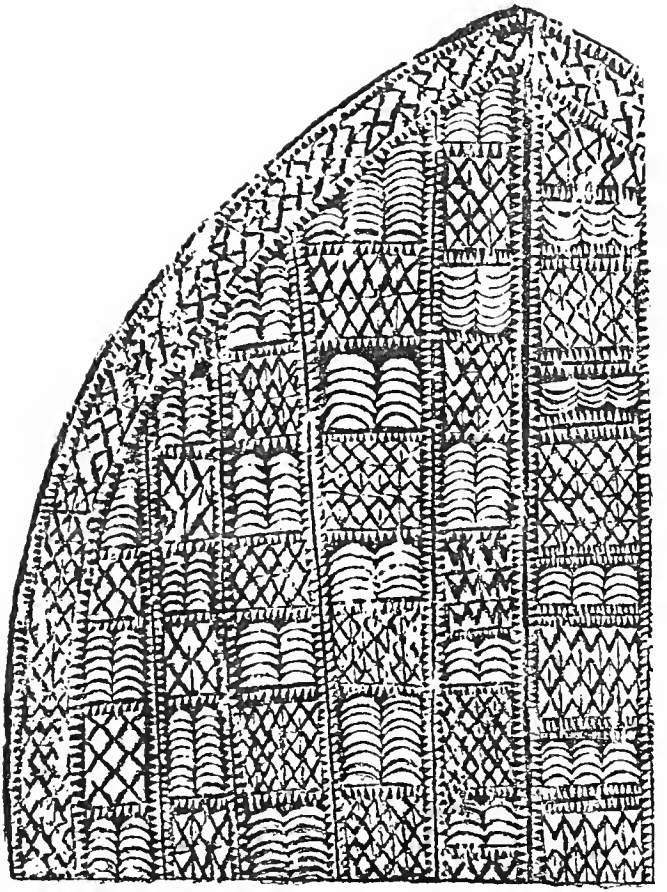


Cut 10. Paddle from Raivavai. Length 122 cm. Heape Collection. After Edge-Partington. Plate 7.

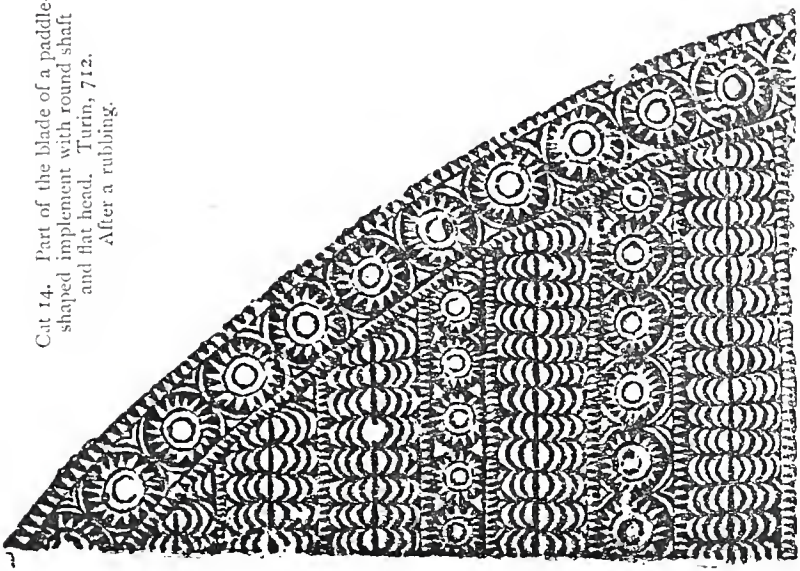


Cut 9. Axe from Raivavai. Length 64 cm. British Museum. After Edge-Partington. Pl. 14, fig. 4.

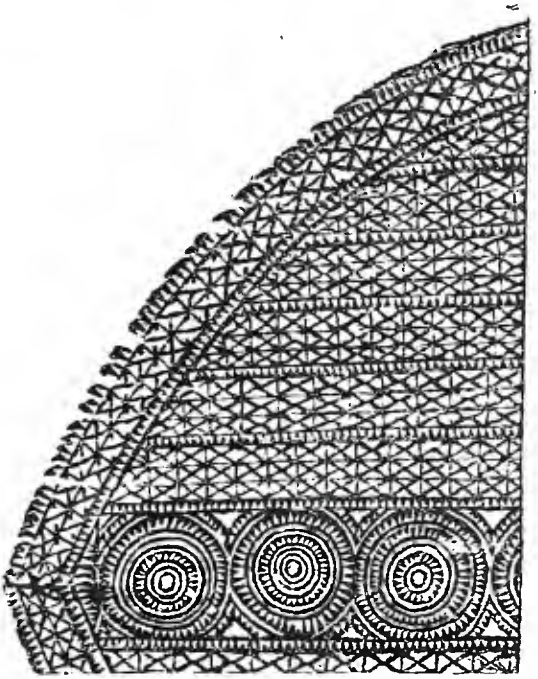
Cut 11.
Shark tooth pattern
(nio mango).



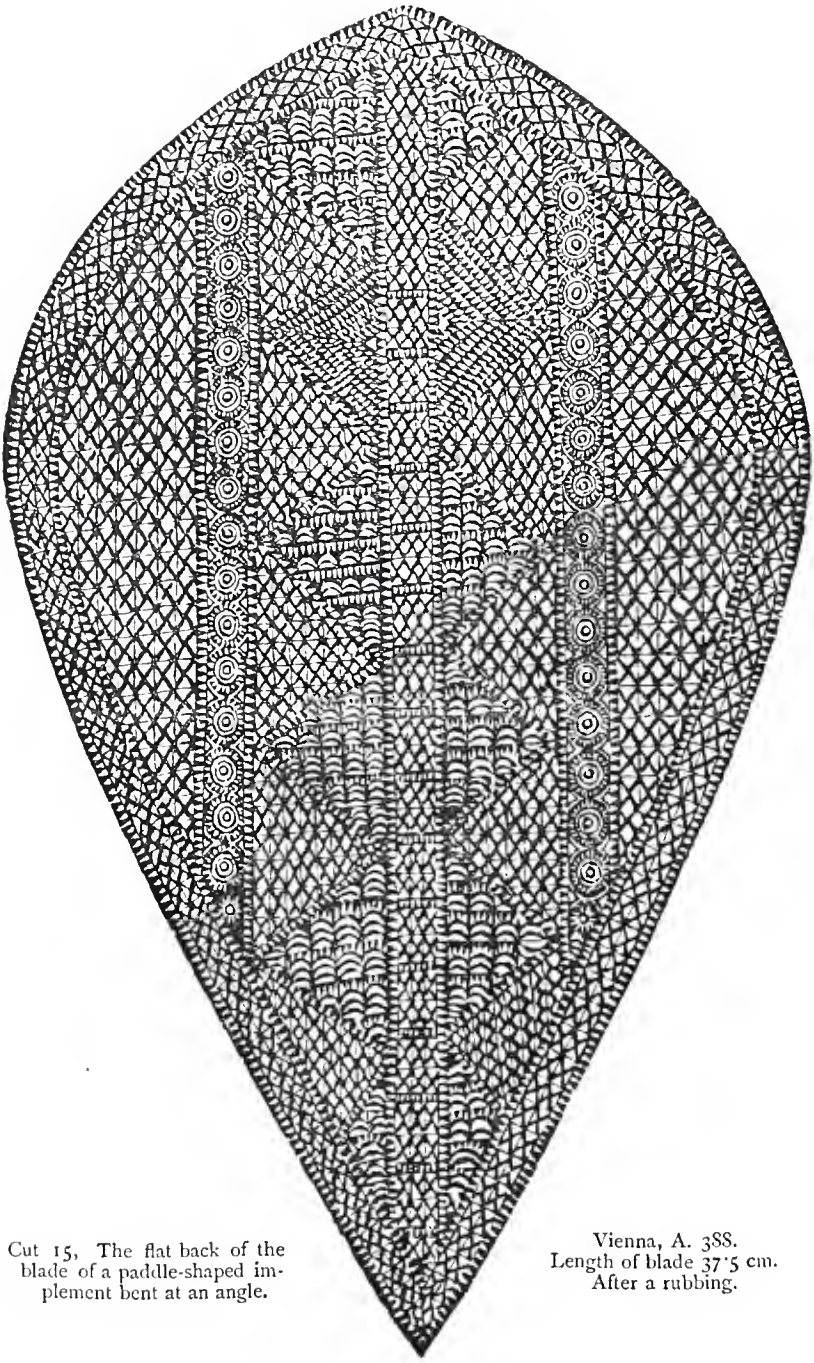
Cut 12. Part of the blade of a paddle-shaped implement with quadrangular shaft and flat terminal (two figures resembling cut 21). After a rubbing. Neuchâtel.



Cut 14. Part of the blade of a paddle-shaped implement with round shaft and flat head. Turin, 712. After a rubbing.

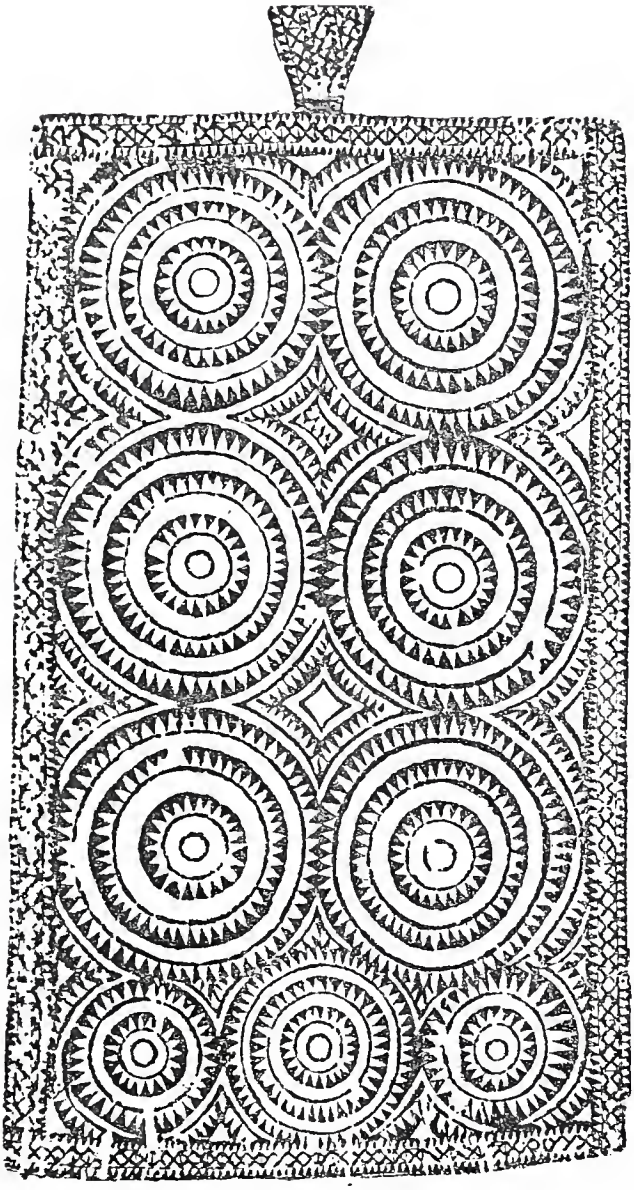


Cut 13. Part of the blade of a paddle-shaped implement with conical shaft head (ten figures). "A paddle from Tahiti, made by natives of Raivavai." Captain Beechey's Collection. Oxford, Ashmolean Museum. After a rubbing.

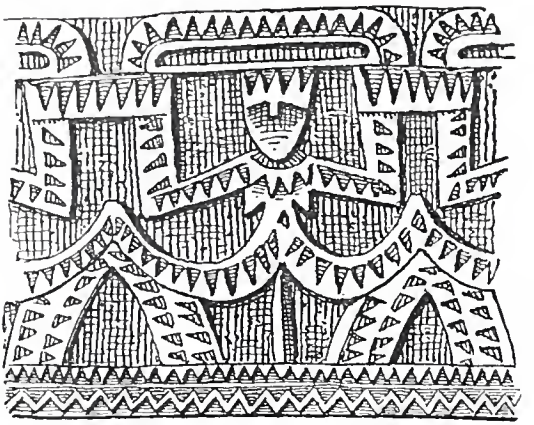


Cut 15, The flat back of the blade of a paddle-shaped implement bent at an angle.

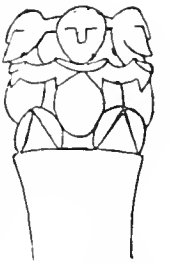
Vienna, A. 388.
Length of blade 37·5 cm.
After a rubbing.



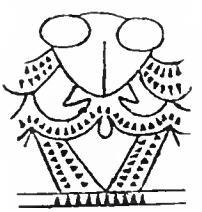
Cut 16. Flat piece of wood, carved on both sides. Length 31·4 cm. Raivavai and Tubuai isles. British Museum, Christy Coll. 9217. After a rubbing.



Cut 17. Part of the flat shaft-head of a scoop with two rows of figures, four in each. Length 107·5 cm. Original drawing, natural size. Basle Mus. (comp. cuts 30—31).

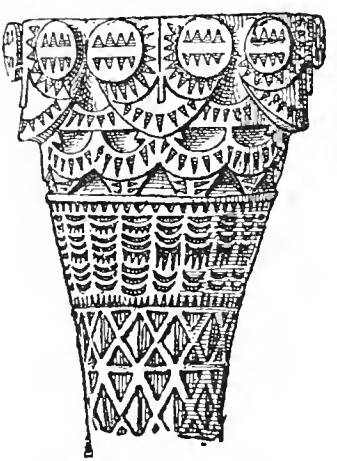


Cut 18. Terminal knob of a paddle-shaped implement. Pitt-Rivers' Collection, No. 551. Raivavai.



Cut 21. Figure from head of paddle-shaped implement. Vienna Ethnographical Museum, E. 595.

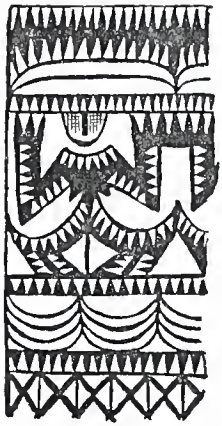
Cut 20. Diagram of face.



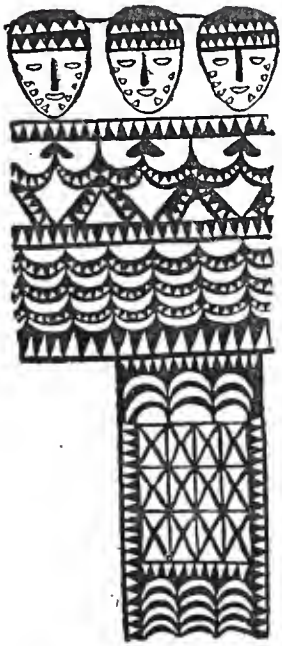
Cut 19. Conical head of paddle-shaped implement. Stockholm Coll. in Acad. of Antiq., 2123/20.

Cut 22. Part of the head of a paddle-shaped implement. Vienna, C. 2569.

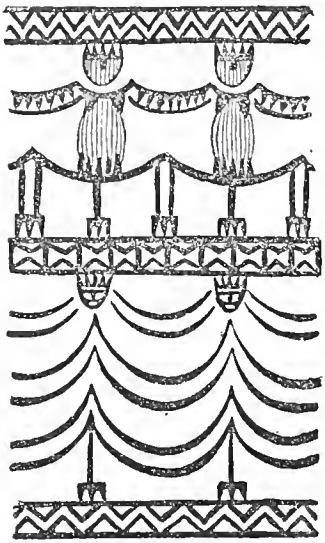
Cut 23. Cut 24.
The small ends of cut 22.
Vienna, C. 2569.



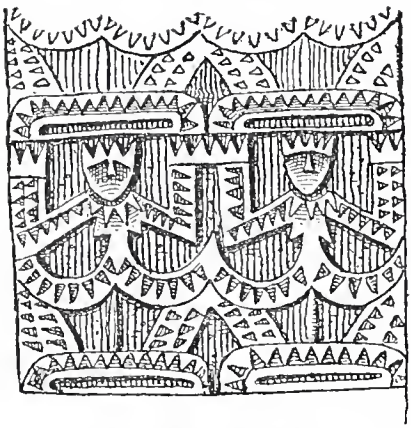
Cut 25. Head of "Paddle," with two rows of figures, five in each. Hamburg, Museum für Völkerkunde, 22.



Cut 26. Cut 27.
Front and Back of the head of a "Paddle." Vienna, C. 2570.



Cut 28. Ornament on a drum. Length about 130 cm. Berlin, VI. 4254.



Cut 30. Shaft of "scoop." Basle Museum.

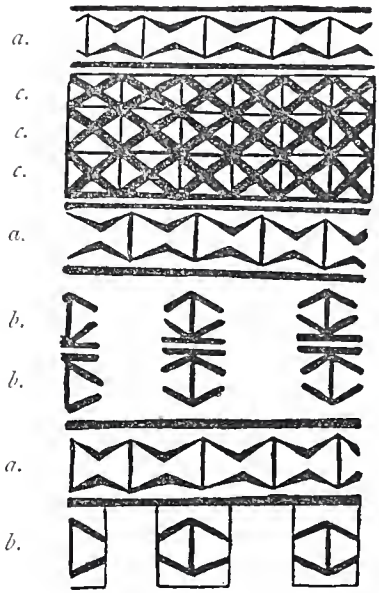
Cut 32. Ornament on axe-shaft. Turin. Armeria-reale.

Cut 29. Stretching cleat of a drum. Berlin, VI. 4254.

Cut 31. Narrow sides of the "scoop" shaft. Basle Museum.

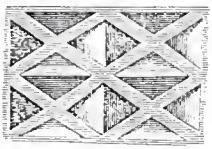
Cut 33. On the blade of a "paddle." Stockholm, Academy of Antiquities, 2123/20.

Cut 34 *a*. Upper end of a staff. Length 111·5 cm. Munich, 727 C.

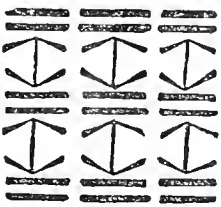


Cut 36. From the lower end of a round axe shaft. Length 143 cm. Neuchâtel.

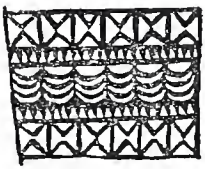
Cut 34 *b*. Detail of the above.



Cut 39. On axe shaft. Stockholm Academy of Antiquities.

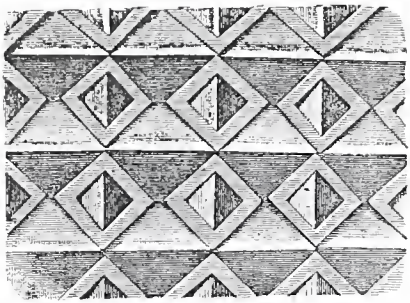


Cut 37. Axe shaft. Neuchâtel.

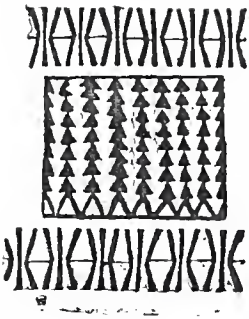


Cut 35. On the point of a lance. Christiania Museum.

Cut 38. Axe shaft. Neuchâtel.

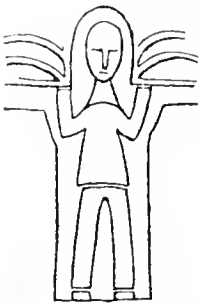


Cut 40. On axe shaft of light wood. Length 137 cm. Neuchâtel.

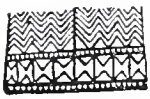


Cut 41. On axe shaft. Chambéry, 521.

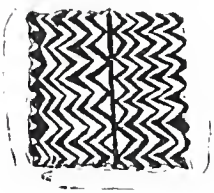
Cut 44. Front of shaft head on a paddle-shaped implement. Copenhagen, I. c. 116.



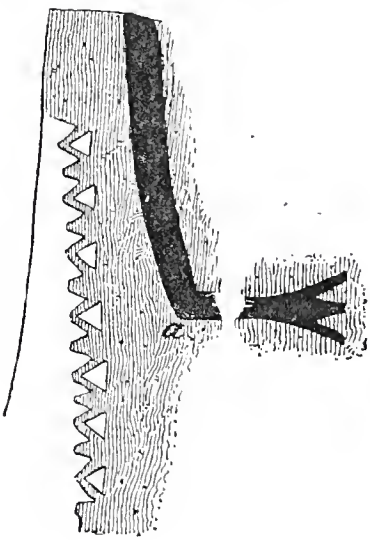
Cut 45. Back of cut 44.



Cut 42. On the shaft of a lance (the same as cut 35). Christiania.

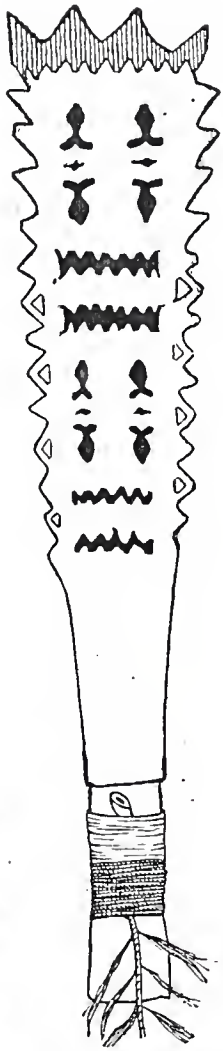


Cut 43. Part of the point of a lance. 73 cm. long. Boulogne.



Cut 46. Ornament on back of the figure of a god from Rarotonga (?). Munich, 2811.

Cut 47.
Sacred symbol of wood.
Lille, No. 7.
From copy of rubbing.



Cut 48.
Sacred symbol of wood.
Lille.

Cut 49. Wooden figure of a god. Tangaroa (?). Present length 74·5 cm. Munich, Verein Samml., 568.

Cut 52.
Club (?).
166 cm. long.
Leyden 61/89.
After a drawing.

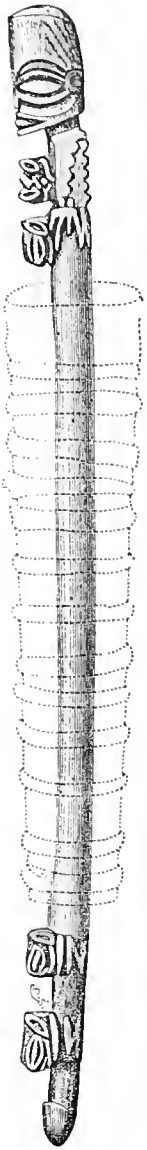
Cut 51. Tangaroa symbol (?) of wood.
Rarotonga. Height about 68 cm.
British Museum. After Edge-Partington.
Plate 24, fig. 4.

Cut 53.
Ornament
immediately below
the blade of
cut 52.

Cut 55.
Ornament
immediately below
the blade of
cut 54.

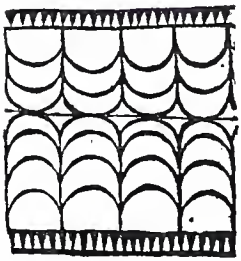
(From rubbings.)

Cut 54. Club. Douay..
Length 150 cm.



Cut 50. Wooden figure of a god. Tangaroa (?). Length 92 cm. Rarotonga. Basle Mission house, No. 1124.

Cut 56. Club from Mangaia. British Museum, Christy Collection, No. 9943. Length 176 cm.



Cut 57. On the shaft of a paddle-shaped implement. Santiago de Chile.

Cut 58. Paddle from the Marquesas Islands. Length 180 cm. Leyden, Inv. 73/3.

N.B.—Cuts 30, 31, 33, 34, 35, 39, 40, 41, and 46 are $\frac{1}{1}$ linear. Cuts 22, 23, 24, 25, 26, 27, 28, 29, 32, 36, 37, 38, 42, 43, 44, 45, 53, and 55 are $\frac{2}{3}$ linear. Cuts 12, 14, and 15 are $\frac{1}{2}$ linear. Cuts 47 and 48 are $\frac{1}{3}$ linear.

Illustrations referred to in Appendix.

Cut 59. Part of a Tangaroa symbol (compare cut 51). British Museum.

a. *b.* *c.*

Cut 60. Elevated knobs representing human figures, $\frac{1}{4}$ linear, *a.* and *b.* from the blade, *c.* from the shaft, of a long wooden lance with undulated blade. Leyden, Inv. 16/552.

PROCEEDINGS.

THIRTEENTH WINTER SESSION, 1890-1.

CONVERSAZIONE

HELD AT THE TOWN HALL, ROCHDALE,

Friday, October 31st, 1890.

ADDRESS BY J. H. WYLIE, M.A., Vice-President.

In opening our Thirteenth Winter Session, I have to congratulate all on the flourishing state of the Society, both as to membership and funds.

Looking back upon the subjects treated by my predecessors in previous years, I find that our venerable President occupied us with an account of his visit to Rouen on the occasion of the Annual Meeting of the French Association for the Advancement of Science. One of our Vice-Presidents summed up the results of the visit of the British Association to Manchester. Another referred to the suitableness of the surrounding hills as opportunities for geologists and botanists, to the interest of place-names, roads, and tracks, all of which points he has since worked out in his recently published History of Rochdale. Another has sketched the history of previous societies which had existed in the town, and recalled the reasons for their disappearance. Thus Rochdale past and present would appear to have been exhausted as a theme. Its future is too large a subject for a ten minutes address, but I may, perhaps, find a topic for a few suggestions, in the possibilities for mental enjoyment offered by it to its inhabitants, it being understood that for anything that I may now say I am myself alone personally responsible, and am liable to be punished for it at the coming general election of officers due at Christmas next.

In dealing with this subject I shall treat of life in Rochdale as purely a town life, for though in this place we are luckily amphibians, with the chance of tempering the dirt of the town with the breeze from the moor, yet, as the dirt preponderates, we may treat our population as towny and not rural, and their thoughts, pleasures, and occupations will follow in the same track. I do not here speak of clubs for sports, such as cricket, football, golf, lacrosse, or tennis, for though essentials as a relief in town life they cannot be claimed as mental relaxation, nor of society revels, for which a privileged few are alone considered eligible, but of opportunities for enjoyment that are open to persons who are too stiff for field sports and too insignificant for admission to drawing rooms, but who still have leisure and must somehow fill it up, whether in solitude or in company. I take it that every one has some favourite pastime for his leisure hours, even if it does not rise above smoking or standing with his hands in his pockets and his back to the fire. The *Nineteenth Century* had a recent article with one of Oscar Wilde's paradoxical titles on the importance of doing nothing, and I am far from denying that much might be made of such a theme. I bequeath it, however, as a subject for some other vice-president or member of the council to enlarge upon in some subsequent opening address. I assume for the present that very few of us are really enamoured of the importance of doing nothing, and that, strictly speaking, you cannot be doing nothing even if you would. Let it be granted, therefore, that the bulk of our population are always doing *something*. I shall assume

also that every one of us has some leisure time that he can call his own, and that until the next reaction sets in we are getting nearer every day to the actual realisation of eight hours of work and eight hours of play. I know that there are some who foresee a future for human perfection in a constant round of automatic unconscious labour, broken only by gulps of scientific lozenges which will supply condensed food and accelerated digestion for the instantaneous refreshment of the machinery, so that it may start again prompt on its endless mechanical grind. But this also I leave aside for treatment by its advocates who are, I know, well able to make out a strong case for the position they take up, including even the all-sufficient lozenge. It will be enough for my purpose to assume as an actual fact that every one has some leisure, and that most people do something with their leisure, and to see in what way such a society as ours can be of any use in helping some of them to do it well.

What then appear to be the subjects that engross the attention of active minds in this town when free to occupy themselves and to organize themselves as they will?

I look over an old Rochdale Almanach and Directory, and I find that in 1884 we had a Society of Anglers, a Debating Society, an Art Society, a Field Naturalists Society, a Microscopical Society, a Floral, Horticultural, and Cottage Gardeners Society, an Auricula Society, an Orchestral Society, a Choral Society, two Glee Clubs, and any number of Brass Bands. But this cannot have exhausted the list, for from time to time I have read of or visited shows and exhibitions promoted by the breeders of song-birds, such as larks, finches, or canaries, and by the fanciers of dogs, rabbits, and pigeons. I have heard it objected that folks should not say that they are members of "learned" societies, and no doubt the word is a little ambitious, but there should be no objection to a courtesy title. Every practitioner in a court is "my learned friend," a doctor who treats mad patients is called a "mad doctor," and I have several friends who are called "religious inspectors," because they inspect in subjects concerning religion. But if the term "learned" may be allowed to some of the above societies, it may come with a shock to some people to hear societies for breeding dogs and pigeons named in the same sentence with societies which are literary and scientific; yet a moment's reflection will show that these latter are in themselves entitled to our highest respect. That many of our people should spend their leisure on such useful subjects as the selection and development of breeds of dogs and birds is in itself a most encouraging sign. We have a member (a clergyman) who has interested us with an account of how he hatches out chickens by artificial heat, and why should we shake our heads about breeding pigeons, especially when Rochdale has at this moment a bird that has performed one of the longest flights on record, finding its way from Bordeaux with marvellous sagacity to its home in Drake Street in seven days? No doubt many of the accessories are low and demoralizing, but in denouncing the pigeon fanciers let us lay the rod on the right back. The pursuit is in itself a civilizing one, and deserves all attention from our members, and if you doubt the scientific value of it, let me read you an extract:—

"Believing that it is always best to study some special group, I have, after deliberation, taken up domestic pigeons. I have kept every breed which I could purchase or obtain, and have been most kindly favoured with skins from several quarters of the world. I have associated with several eminent fanciers, and have been permitted to join two of the London Pigeon Clubs. The diversity of the breeds is something astonishing."

The passage is from the "Origin of Species," and it shows the value set upon the pursuit by so humane a scientist as Charles Darwin.

Foremost of all associated town pleasures comes music, vocal or orchestral. A cheaper, more accessible, more elevating form of enjoyment has not yet been devised. It is, of course, mere Pecksniff to say that:

"The man that hath not music in himself,
Nor is not moved with concord of sweet sounds,
Is fit for treasons, stratagems, and spoils,—
Let no such man be trusted."

But I believe there is inspired truth in the old superstition that music can drive the evil spirit out of a man, even when he is by himself; but when he joins, by voice or instrument, in harmony with others, his attention is engrossed and his spirit touched in a way that no other occupation can approach. Some few weeks ago I read of a musical festival at Hanley, in the Potteries. I do not know the population of Hanley, but I suspect that it is not half that of Rochdale, and I will never believe that one locality has all the musical ability and another all the discord. It only wants the bringing out. Many times I have been absolutely ashamed when some of the gifted leaders of music have visited our town to see this hall half empty. Why should we not have here a strong choral and orchestral society, to which every member of a church or chapel choir should belong? and I see no reason why an upward process of musical education should not go forward here as distinctly as it has among the public in Manchester since Sir Charles Hallé settled amongst them. Then a Rochdale Musical Festival might be an event to which every one of us would look forward, and which every one of us should do his best to promote.

I look around in vain for a valuable organization that once was and now is not, the Rochdale Art Society. Whether its annual exhibitions, by which it used to make itself known, were good, bad, or indifferent, I say that the very existence of the society was a good in itself, while its easy death and burial are so much to our discredit as a town. It brought together, for mutual encouragement, those who were engaged in a common form of relaxation, and who otherwise, perhaps, would never have met, and if the scores of students who annually qualify themselves under the discipline of the art classes in the town had real enthusiasm for beauty of colour or form, whether on canvas, in stone, in metal, or in clay, they would band themselves together to revive for mutual help an Art Society, whose pride it should be to enter a ceaseless practical protest against the grimy ugliness with which we are surrounded.

While mourning over the dead, let me put in a friendly tear to the memory of the Rochdale Parliamentary Debating Society. My personal connection with it makes makes me mistrust myself in speaking of its departed worth. No doubt it had its vulnerable side, and to many it might seem that its members were only "putting peas in each other's ears to drive each other crazy," but from eight years of personal observation I am able to say that it met an acknowledged want, for it taught some measure of self-control to ardent politicians, and proved that it is possible to grow white-hot over political topics without striking your opponent in the face. *Resurgat!* say I, and that soon! for it did some good while the life was in it.

The Anglers should be our special friends for we have on our council a gentleman who has experimented largely on the hatching out of trout and salmon fry in the Piethorn reservoirs, and any reflections that may be borne in on some local Isaac Walton during a day of contemplation in a punt at Cowm will interest our members and secure at least a wealth of sympathy.

So too our hearts are open to the Flower Growers and the Cottage Gardeners. I remember that there was once a separate society for the growth of Auriculas, but it seems not to have been able to stand alone. Still if the Annual Midsummer Flower Show keeps up we have something to be proud of, and interest might be further kept alive if smaller special classes of plants were exhibited at their own season as chrysanthemums are at the Temple Gardens in London. It is something that the experiment of tree planting on the Parade was a direct result of a valuable paper read by one of our members at a meeting of this society last winter.

The Microscopical Society has had a chequered course. Nine years ago I remember a most interesting exhibition promoted by its members in the Public Hall. It resulted I believe in a money loss, and has not been repeated. But the members are so much in evidence to-night, and have for so long supplied a large share of the interest at our opening meetings, that I make bold to claim them all as a part of ourselves, slides, lenses, object glasses, reflectors and all.

All these societies are evidences of the spontaneous activity alive in our midst providing and organizing mental pleasures for our hours of leisure. I do not for a moment say that when we are at our daily work our minds are asleep or that we are not then carefully observing, noting, and storing up facts which would be valuable material for after discussion. Our society would welcome any papers offered by those who know, let us say, the secrets of sizing, or the mysteries of futures in cotton, or corners in wool, or improvements in machinery, or fluctuations in markets; though I have my doubts whether the example would spread far after a few trade secrets had been generously divulged. I anticipate therefore but little fruit from the shop. The bread and cheese work that we do does not as a rule disclose our real likings. What a man is paid to do he does because he must. What he does in his leasure time he does because he likes it. He does it *con amore*, and it is only into such pursuits that he throws his whole soul. That is the sort of material that we want to tap if it is wholesome of its kind, and there is no subject however trifling on which a man busies himself for the mere love of it that will come amiss to us as a society. Left to themselves men will choose their own subjects, and the greater the minuteness with which they work them out, the more they are welcome at our meetings. The proverb that "law cares nought for the smallest" is in our case reversed. Large generalizations are all very well for indolent minds who like results presented in a sentence and pronounce in an instant on the merits of the finished statue, but ignore the laborious chipping that has shaped it slowly from the rough. But we are here to do honour to the chippers in Literature and Science. We find a market for their wares, knowing that the patient worker digs for details, respects the minutest facts, and distrusts his theories so long as they fail to account for the facts. Give us the man who works at details, who makes himself master of even *one* subject however obscure. His friends call him a "faddist" and a "bore" and run away from him. *We* give him shelter in our breast and call him a "specialist" and an "authority."

Nothing indeed is too large for us as a Society, and nothing too small. One evening we speculate on the origin of life on this planet, another we devote to the measurement of the flakes of soot that settle in our park. I have known men who have given up their whole spare time to collecting coins, rubbing brasses, copying goldsmith's marks on plate, or mason-marks on stones. One of my friends buys up all the early printed Latin Bibles that he can get, another all the possible editions of Robinson Crusoe. Then there are the anthropologists, the men who measure noses or ears or facial angles, and if it be true, that no two thumb-marks are exactly alike, I see no end to the observations necessary to complete their enquiry. The other day I listened in a school to an object lesson on the snail. Two fine healthy specimens of snails were there in a bottle to be shown to the children to prove that the lesson was all true. Asking where they came from, I was told that they were from the Isle of Man, that there were no snails in Rochdale, and many of the children had never seen one before. Here is a question for the Field Naturalist. If this is so, why is it so? I know that snails are common enough in some Lancashire gardens, then what makes them stop short and become unproductive in Rochdale? I should have liked to say a word or two on the interesting subject of proper names derived from trades, occupations, patronymics, and localities, and especially on the question of our local dialect which is calmly assumed to be doomed to destruction or already a thing of the past. One

thing is certain that when it is dead not all the learning of all the professors can bring it to life again, and our society should do something to honour the memory of such men as Tim Bobbin and Ned Waugh, who have made it classic and saved it at least in writing from perishing for ever. In these and in a dozen other ways we might extend the usefulness of our society. We have a catholic council—we know no politics and no religion, and allow no fighting over tender subjects. We are a meeting place for all where they may stand a chance of correcting the narrowing influence of church and chapel. We publish periodically a volume in which any valuable observations can be preserved and perpetuated. We have not condescended to dancing as a means of attracting members, and we rely upon ourselves without spending our funds on special lecturers from without. From the first start we have raised a high standard of effort from which we do not mean to descend, and we are confident that our society will not easily die if we make it indispensable to the life of the town.

The following objects were exhibited :—

Examples of Needlework and Embroidery, &c., by several members.

Curiosities of the Woollen Trade in Rochdale. Samples of goods, 1811-23, Circulars relating to Wages, Prices of Flannels, &c., by C. M. Royds. J.P., D.L.; H. Chadwick; R. Slack, and J. Wild.

Placard inviting service in the Rochdale Independent Volunteers, June 20th, 1794.

Circular, signed by John Entwisle, Esq., Lieut.-Col. Commandant Rochdale Volunteers, requesting men to be in readiness against French invaders, dated, Foxholes, the 27th August, 1801, lent by the Free Library Committee.

Facsimile of Magna Charta. Facsimile of Warrant to Execute Charles I., by Lt.-Col. Fishwick, F.S.A.

Reprints of Early Newspapers: — "English Mercurie," A.D. 1588. "Weekeley News," 1606. "Intelligencer," 1648. "Gazette," 1658. "London Gazette," 1666. "Congress of United States," 1793. "Times," A.D. 1792. "Times" (account of the Funeral of Nelson), 1806, by Lt.-Col. Fishwick, F.S.A.

Photographs of Italy and Switzerland, by Miss Aldridge.

Curiosities from Corinth, Salamis, Marathon, and Pæstum, by Mr. James Ogden.

Numismatic Collection, including Copper Tokens struck in Rochdale, A.D. 1792, payable at the Warehouse of John Kershaw; and some struck by the Anglesea Mining Company for Rochdale; also a Brass Token of Richard Kenion, A.D. 1667, by James Challen.

Old Flemish Cross-Bow, by Charles Heape.

Specimens of the Stones used for paving the streets of Rochdale, with Microscopic Sections, by S. S. Platt.

Flint Arrow Head found by Mr. Parker near Facit, by Rev. E. H. Aldridge.

Specimens of British Geraniums and Thistles, by Thomas Hunt, M.D., M.S.

Drawings of British Butterflies, by Rev. J. Stuttard.

Microscopes, Pneumatic and Chemical Apparatus, Geological Specimens, &c., &c.

ORDINARY MEETING

In the Lecture Room of the Y.M.C.A., The Butts, Friday, Nov. 21st, 1890.

H. C. March, M.D., Vice-President, in the Chair.

Auditor, elected in accordance with Rule XVII.: Edward Lyon Taylor.

The following paper was read :—

"Erratic Blocks in the Neighbourhood," by James Horsfall.

ORDINARY MEETING

Held at the Town Hall, Friday, Dec. 5th, 1890.

J. R. Heape, Vice-President, in the Chair.

The following paper was read:—

"The History of a Glacier," by James Ogden.

ANNUAL MEETING

Held at the Town Hall, Friday, Dec. 19th, 1890.

H. C. March, M.D., Vice-President, in the Chair.

The death of the President of the Society, Rev. Canon Molesworth, M.A., LL.D., having taken place a few hours previous to the meeting, a resolution was passed expressing deep regret at the loss the society had sustained, and sincere sympathy with Mrs. Molesworth and her family in their bereavement.

The Report was read by the Secretary and adopted. The Balance Sheet was presented by the Treasurer and passed. A Ballot was then taken for the Election of the Council and Officers for the ensuing year. The President's chair was left vacant.

The following short communication was read:—

"Cremation," by Rev. J. A. Lowry.

SPECIAL MEETING

Held at the Town Hall, Friday, Dec. 19th, 1890 (prior to the Annual Meeting).

This meeting was summoned under Rule XII., and passed a resolution for the alteration of Rule V., by which the subscription to the Society was augmented to six shillings, each member hereafter being entitled to a Volume of Transactions of the Society whenever published.

It was also resolved that seven days' instead of ten days' notice should be sufficient when summoning a special meeting under Rule XII.

ORDINARY MEETING

Held at the Town Hall, Friday, Jan. 16th, 1891.

J. R. Heape, Vice-President, in the Chair.

The following paper was read:—

"Desiderata in our National Education," by Rev. J. Hirst Hollowell.

ORDINARY MEETING

Held at the Town Hall, Friday, Jan. 30th, 1891.

J. H. Wylie, M.A., Vice-President in the Chair.

In accordance with a resolution passed at the previous meeting the election of President took place. By unanimous vote, Dr. H. C. March was elected as President.

The following paper was read:—

"Robert Browning," by J. W. Bamford.

ORDINARY MEETING

Held at the Town Hall, Friday, Feb. 13th, 1891.

H. C. March, M.D., President in the Chair.

The following paper was read :—

"The New Astronomy," by Ven. Archdeacon Wilson, M.A.

ORDINARY MEETING.

Held at the Town Hall, Friday, Feb. 27th, 1891.

H. C. March, M.D., President, in the Chair.

The following short communications were read :—

(1) "Report of the Conference of Delegates at the British Association Meeting at Leeds, by J. R. Ashworth.

(2) "Bead Mosses," by T. S. Smithson.—*See page* 1.

(3) "A Visit to Ilfracombe," by James Horsfall.

(4) "Accidental Occurrence of Flints in Tumuli," by H. C. March, M.D.

The following objects were exhibited :—

(a) "Flints from the Isle of Man (Peel)," by Dr. March.

(b) "Old Papers and Documents referring to some Local Inhabitants," lent by Thomas King.

ORDINARY MEETING

Held at the Town Hall, Friday, March 13th, 1891.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Our Forefathers," by Thomas Hunt, M.D., M.S.

ORDINARY MEETING

Held at the Town Hall, Friday, April 3rd, 1891.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Coal Smoke," by Thomas Stenhouse, F.C.S., F.I.C.—*See page* 13.

FOURTEENTH WINTER SESSION, 1891-2.

CONVERSAZIONE

Held at the Town Hall, Thursday, Oct. 22nd, 1891.

Address by H. C. March, President.

As the mouthpiece of the Literary and Scientific Society, it is an agreeable duty to welcome our friends to our annual gathering and to express a hope that the sympathy that has given us your company here to-night will make you afterwards our permanent associates.

It is true that Rochdale has other literary and scientific societies, but those have, for the most part, what it is the custom to call a sectarian flavour, and lack that catholicity in which we profess to rejoice.

Our dear brother Calvin, for example, readily admits that it is not good for him to be *always* reading logical essays to his personal admirers; and our distinguished friend Pantacles, that astonishing product of modern thought, who is broad and high and deep and round and square, all at the same time, is free to confess that even his own oracular declarations ought *sometimes* to be checked by adverse criticism.

In fact we all agree that, on the whole, there is nothing so useful, so interesting, so stimulating as the open interchange of antagonistic opinions. And though we have a sort of understanding that no red-hot political, no perfervid theological subject must be introduced; though it is possible that the Council might decline a paper on Home Rule, or an inquiry into the elements of our Faith; they would hardly object to a discourse on the Autonomy of Federated States, or to a consideration of the Literary Aspects of the Athanasian Creed.

That there may be no needless alarm, let it be said at once that the subjects to be dealt with during the current session are not of an acrid or irritating nature. They are fairly divided between science and literature, and may be classed under astronomy, botany, physics, poetry, archæology, sociology and evolution; and we expect, besides, a number of short communications of great interest.

So we look forward to many pleasant controversies, to some intellectual tilts and tournaments, to much mutual improvement. "Iron sharpeneth iron; so a man sharpeneth the countenance of his friend."

When the late Canon Molesworth was our President, he never failed to remind us of the melancholy fact that Rochdale is without a Museum; and even to offer a portion of his own slender fortune to help us to install one.

It happens in some countries that when men grow rich in a town, and in general they can do this only by the humble co-operation of their fellows, they take a pride in bestowing their wealth on the town's adornment, and in raising all manner of beautiful buildings for the good of the community. Rochdale has always been a busy, and to many persons a profitable place. If we look back into the past we behold a shining constellation of prosperous corn millers, bankers, flannel-makers, iron-workers, cotton-spinners. What did they all do with their money?

They built us, no doubt, a few churches and chapels, for which we are profoundly grateful; and a commodious infirmary, for which we are not half grateful enough; and one or too starveling schools. But they did not give us our town hall, our park, the free-library and the public-baths; and if the people had not been left to provide these things for themselves, we should have had, no doubt, in this year of grace, a municipal Museum. Meanwhile the wealth of our rich men has rolled away from us, in a steady stream, and has locked itself up in Asiatic railways and Canadian forests.

It has been remarked that a local museum, if it were judged by its contents, might have a notice posted outside—"Rubbish may be shot here." And a man of light and leading said one day that we did not want a place in Rochdale for "old pots and painted Venuses."

Alas! that our eyes are holden, that they see not how bitterly those who come after will reproach us for having made no abiding place for god-like works of art; for matters of technical and scientific value, that concern the lives of men; and for those relics of the past that are swiftly vanishing away.

We do not want a building to be stuffed with mouldy butterflies and birds from the tropics; to be swung with whales and crocodiles that hang in mid-air; to be garrisoned with skeletons of anthropoid apes, with sentry-boxes for the Elk and the Dodo.

But we want a setting out of our local products—our own different kinds of coal, with an appended analysis, and an estimate of their heat-giving and light-giving qualities; specimens of our grits and sand-stones; examples of our paving, flagging, roofing and building-stones, with an account of their properties; fossils peculiar to the district; our own fabrics, of which Rochdale is proud. Samples of the "foreign drift," as geologists call it, that is scattered over our moors and meadows, with corresponding specimens from the beds of origin, and a map to show the course of the glaciers or the icebergs that brought them. Local relics of the past—books, portraits, personal memorials; relics of our Saxon and Scandinavian forefathers, of our Celtic predecessors, of the Roman occupation, of that far-off race who left their stone-implements on all the hills.

Let us, then, preserve our "old pots," our own archæological treasures; let us keep, if we can only get them, types of celestial beauty, a sculptured Apollo, or, if it may be, a painted Venus; let us make a perfect local geological collection; and let us array in chronological order, our velvets and carpets and cotton fabrics, our iron and wood and leather products, our flannels and, if the roof will not fall, our flannelettes.

The Council take this opportunity to express their thanks to those associates and other friends who have lent so many things to this evening's entertainment, and have put themselves to no little pain and trouble for our common enjoyment.

The following objects were exhibited :—

A Collection of Portraits (principally Oil Paintings) of Old Inhabitants of Rochdale and the Neighbourhood.

Tongan Curiosities, by Mrs. J. Hamilton.

Norse Barrel-made Ale Jug, by Mrs. H. C. March.

Reprint of an old Meteorological Record kept at Driby, Lincolnshire, A.D. 1337-1344, by W. Watts, F.G.S.

Summons to appear before the Earl of Derby's Court, about 250 years old, by Rev. J. Stopford, M.A.

A Collection of Old Maps:—London, 1563; Yorkshire, 1728; Rochdale, 1829, by R. W. Schofield, H. C. March, and James Clegg.

Publications of the Egypt Exploration Fund, and other works, by the Free Library Committee.

Specimens of British Umbelliferæ, by Thomas Hunt, M.D.

Flint Arrow Heads, recently found in the neighbourhood, by W. A. Parker.

Geological Specimens of the Coal Measures, by various members.

A Novel Microphone, &c., by J. R. Ashworth.

Specimens of Gold Quartz and Diamondiferous Ore from South Africa, by H. Scott, &c., &c.

ORDINARY MEETING

Held at the Town Hall, Friday, Nov. 13th, 1891.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Leaves," by T. S. Smithson.

ORDINARY MEETING

Held at the Town Hall, Friday, Nov. 27th, 1891.

H. C. March, M.D., President in the Chair.

Auditor, elected in accordance with Rule XVII.: Henry Booth.

The following paper was read :—

"Some Principles of Hydrology and Meteorology," by W. Watts, F.G.S.

ANNUAL MEETING

Held at the Town Hall, Tuesday, Dec. 15th, 1891.

H. C. March, M.D., President, in the Chair.

The Report was read by the Secretary and adopted. The Balance Sheet was presented by the Treasurer and passed. A Ballot was then taken for the Election of the Council and Officers for the ensuing year.

The following paper was read :-

"The Pagan-Christian Overlap," by H. C. March, M.D.

ORDINARY MEETING

Held at the Town Hall, Friday, Jan. 8th, 1892.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Our Local Problem of Poverty," by Rev. R. Veitch, M.A.—*See page* 21.

ORDINARY MEETING

Held at the Town Hall, Friday, Jan. 22nd, 1892.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Rochdale Surnames," by Lt.-Col. Fishwick, F.S.A.—*See page* 31.

ORDINARY MEETING

Held at the Town Hall, Friday, Feb. 12th, 1892.

H. C. March, M.D., President, in the Chair.

The following short communications were read :—

(1) "Old Coins: English, Scotch, and Irish," by Thomas Hunt, M.D.
(2) "Some Recent Results of the Investigation into Local Erratic Blocks," by S. S. Platt, A.M.I.C.E.—*See page* 52.
(3) "Sir Walter Scott's Novels," by J. W. Bamford.
(4) "Indian Flints," by H. C. March, M.D.

Old Coins, Fragments of Erratics, and Drawings of Flints were exhibited.

ORDINARY MEETING

Held at the Town Hall, Friday, March 4th, 1892.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Attic Comedy as shewn in Aristophanes," by George Kemp, B.A.

ORDINARY MEETING.

Held at the Town Hall, Friday, March 11th, 1892.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"The Evolution of Savage Ornamental Motives," translated from a paper by Herr Stolpe, by Mrs. H. C. March.—*See page* 73.

ORDINARY MEETING

Held at the Lecture Room, Public Hall, Friday, March 25th, 1892.

H. C. March, M.D., President, in the Chair.

The following paper was read :—

"Discoveries and Problems of Modern Astronomy," by Ven Archdeacon Wilson, M.A.—*See page* 57.

ORDINARY MEETING

Held at the Town Hall, Friday, April 8th, 1892.

H. C. March, M.D., President, in the Chair.

The following short communications were read :—

(1) "Intelligent Atoms," by James Horsfall.
(2) "Magic Knots," by H. C. March, M.D.—*See page* 59.
(3) "Temperature of the Rochdale Reservoir Waters."—*See page* 65.

EXCURSIONS, 1891.

Ribchester, Saturday, May 30th, 1891.

Leader...Lt.-Col. Fishwick, F.S.A.

Route:—Train from Rochdale at 12-20 p.m. to Wilpshire *via* Bolton and Blackburn. Wagonettes conveyed the party thence to Ribchester. The Church and Roman Remains were visited, also the Stidd Chapel. Train from Wilpshire left at 7-11 p.m., and arrived at Rochdale at 8-58 p.m.

Naden and Rooley Moor, Saturday, June 13th, 1891.

Leaders...James Horsfall and W. A. Parker.

Route:—Omnibus at 2-30 p.m., from White Hart Inn to Norden. Thence by Greenbooth to the Heywood Reservoirs and up the Hill-side to the "Moorcock Inn," Rooley Moor, returning homewards by the main road.

Heysham and Lancaster, Saturday, June 27th, 1891.

Leader.....H. C. March, M.D.

Route:—Train from Rochdale at 9-42 a.m., arriving at Lancaster at 11-35 a.m. The Castle was visited, and the recently discovered Roman Antiquities therein inspected. Thence by train to Morecambe and tram to Heysham to view the old Church and the singular rock-hewn coffins. The Excursionists left Lancaster at 7-21 p.m., arriving at Rochdale at 9-30 p.m.

Astley Hall, Saturday, July 11th, 1891.

Leader...J. E. Schunck.

Route:—Train to Chorley at 2-13 p.m., arriving at 3-15 p.m. A walk of three-quarters of a mile led to Astley Hall, an Elizabethan Structure, containing some historic paintings, fine old oak furniture, &c., permission to view which had been courteously granted by J. Towneley Towneley-Parker, Esq. Rochdale was reached at 9 p.m.

Melandra Castle, Saturday, September 5th, 1891.

Leader...Thomas Hunt, M.D., M.S.

Route:—Train from Rochdale at 3 p.m., arriving at Mottram at 5 p.m. A walk of two miles led to the summit of a low hill, upon which four ramparts enclosing a square space are plainly visible with four well defined gateways. In a farmhouse close at hand is a stone with the following inscription:—

CHO. I.
FRISIANO
VALV, Vt
ALIS

from which it is evident that the first cohort of the Frisians was here stationed. The Excursionists returned from Glossop at 7-30 p.m. *via* Manchester, reaching Rochdale about 10 p.m.

EXCURSIONS, 1892.

Rivington Pike, Saturday, May 28th, 1892.

Leader...Edward Lyon Taylor.

Route :—Train from Rochdale at 2-10 p.m. to Horwich. The Pike which rises considerably over 1000 feet above sea-level, and was formerly used as a beacon hill from its conspicuous position, was ascended. The Excursionists returned by Rivington and Horwich or Adlington, reaching Rochdale at 9-30 p.m.

"*Pecket Well*," Saturday, June 18th, 1892.

Leader...W. H. Sutcliffe.

Route :—Train from Rochdale at 2-7 p.m. to Mytholmroyd. Thence over a wide moor, where two Roman Camps were traced, to "Pecket Well" and Heptonstall. The Excursionists left Hebden Bridge at 8-32 and arrived at Rochdale at 9-10 p.m.

City of Chester, Saturday, July 23rd, 1892.

Leader...Dr. Hunt.

Route :—Train from Rochdale at 12-55 p.m., arriving at Chester at 2-55 p.m. The walls were ascended at Eastgate Street, and persued by Phœnix Tower, Bonwaldesthorne's, and Water Tower to Chester Castle; subsequently the Grosvenor Museum, the Cathedral, God's Providence House and the Rows were visited. The return train arrived at Rochdale about 10 p.m.

Whiteley Dean, Saturday, September 3rd, 1892.

Leader...S. S. Platt, C.E.

Route :—Train from Rochdale at 2-25 p.m. for Littleborough, and from there by Hollingworth Lake, Tunshill Hey, Whiteley Dean, Nicholas Pike, and Piethorn to Newhey, returning to Rochdale at 7-40 p.m. The object of the excursion was the investigation of erratic blocks.

REPORT

READ AT THE

ANNUAL MEETING, DECEMBER 15TH, 1891.

IN accordance with the XVIIIth Rule the Council have pleasure in presenting their Report and Balance Sheet of the affairs of the Society for the thirteenth year, ending December 31st, 1891.

At the time of the last Report the Roll contained the names of 243 members, since then 21 members have been elected and 20 names have been removed, 17 of these by resignation and 3 by death. The present total is, therefore, one more than last year, namely, 244.

A satisfactory Statement of Accounts is submitted by the Treasurer. The Receipts from Subscriptions, Bank Interest, and Sales of Transactions and Tickets have been £69 6s. 4d., and the Expenditure for the usual items £51 0s. 5d., leaving a surplus for the year of £18 5s. 11d., which added to the sum in hand last year raises the disposable balance to £45 7s. 2d. In addition there are some Subscriptions amounting to about £8 yet to be received and placed to the credit of the Society. The average cost per member has been 4s. 2d.

The Council and the whole Society have sustained a severe loss in the death, on the date of the last Annual Meeting, of the Rev. Canon Molesworth, M.A., LL.D., who, from the foundation of the Society, had occupied the Presidential Chair, and in the discharge of his office, so long as health permitted him, zealously contributed to promote the Literary and Scientific pursuits for which the Society was organized.

The vacancy thus occasioned was not immediately filled, the election of President being postponed until the Ordinary Meeting of January 30th, when Dr. H. C. March, the senior Vice-President, was unanimously appointed to this office. The result of the election for the other officers, which took place at the Annual Meeting on December 19th, 1890, placed Dr. Thomas Hunt in the seat occupied by Mr. R. Robinson, and Mr. Ed. Lyon Taylor in the Treasurer's office, Mr. Reginald W. Shaw, the late Hon. Treasurer, not offering himself for re-election. The Council desire to record their sense of the obligation the Society is under for the manner in which Mr. Shaw discharged his onerous duties during the six years he held the post of Treasurer, and for thus contributing by a careful administration of the finances to insure the stability of the Society.

The election of Dr. March as President, subsequent to the Annual Election of Officers, caused a vacancy in the list of Vice-Presidents which the Council, at a meeting held on April 29th, filled by the appointment of Mr. Charles Heape, whose place in the list of Councillors was taken by Mr. Richard Robinson.

A Special Meeting took place on December 19th, 1890, at which it was resolved, as an alteration of Rule V., that the Subscription to the Society should, in future, be six shillings instead of five shillings, and that each member should be entitled to a copy of the Transactions whenever published. The experience of the past twelve months has shewn that this new regulation has received an unanimous support, and it has very materially augmented the receipts of the Society. The same meeting sanctioned a minor alteration of Rule XII., by which seven days' instead of ten days' notice is to be sufficient for summoning a Special Meeting.

Eight Ordinary Meetings, and the Annual Meeting, have been held during the months of January, February, March, April, November, and December. One of these meetings was occupied with short communications, and at the others papers were read, a list of which is appended. Five Field Meetings have been held in the months of May, June, July, and September, but the wet weather which generally prevailed during the summer considerably reduced the attendance and frustrated the object of one of the excursions.

The present Winter Season has been opened by a Conversazione, held in the Great Room of the Town Hall, at which, in addition to the Scientific and Literary Exhibits, a specially attractive feature was the fine collection of Oil Paintings of Old Rochdale Inhabitants.

The Society has again been re-elected as a Corresponding Society of the British Association, and was represented at the Cardiff Meeting by Mr. Richard Robinson, who reports that the Temperature Observations conducted by the Society at the Rochdale Reservoirs have been considered of sufficient interest to demand detailed treatment in the final report which the Committee of the British Association engaged in this research will shortly issue.

Mr. S. S. Platt, in conjunction with other members, is prosecuting the investigation on the Distribution of Boulders, and the valuable results he has obtained are to be embodied in a map which will exhibit a fairly complete record of the position and size, &c., of the Erratics in this locality.

During the year the Society has received in exchange for its Transactions the current Publications of the Manchester Geological Society, the Manchester Literary and Philosophical Society, Marlborough College Natural History Society, Manchester Museum, Owen's College, Manchester Microscopical Society, Liverpool Geological Association, the British Association, and the Yorkshire Naturalists' Union (the latter presenting a complete set of their volumes), in addition to miscellaneous papers and pamphlets for which formal thanks are now tendered.

Finally, acknowledgments are due to those who have actively promoted the good of the Society by reading papers, leading excursions, by the loan of objects for exhibition, and in other ways; and in particular the Council wish to recognise the gifts by the Rev. A. Pagan, M.A. of fragments of boulders found near Cronkeyshaw, and by Mr. J. J. Sparkes of several cases of miscellaneous geological specimens. These gifts have been made in the hope that they may lead to the formation of the nucleus of a museum, and the Council accept them as an indication that when the establishment of such an institution shall take place it will call forth the sympathetic support of all who labour in the fields the Society cultivates.

SYLLABUS, 1890-1.

1890.

FRIDAYS.

Oct. 31st.—Opening Conversazione.

Nov. 7th.—"The Passion-Play at Oberammergau"..Mr. J. H. WYLIE, M.A.

Nov. 21st.—"Erratic Blocks in the Neighbourhood"...Mr. JAS. HORSFALL

Dec. 5th.—"The History of a Glacier"..... Mr. JAMES OGDEN

Dec. 19th.—Annual Meeting. Paper on "Cremation," by Rev. J. A. LOWRY.

1891.

Jan. 16th.—"Desiderata in our National Education" ..... Rev. J. H. HOLLOWELL

Jan. 30th.—"Robert Browning" .....Mr. J. W. BAMFORD

Feb. 13th.—"The New Astronomy".....VEN. ARCHDEACON WILSON, M.A.

Feb. 27th.—Short Communications.

"Report of the Delegate to the British Association" ..... Mr. J. R. ASHWORTH

"Bead Mosses" ..... Mr. T. S. SMITHSON

"A Visit to Ilfracombe" ..... Mr. JAMES HORSFALL

"The Accidental Occurrence of Flints in Tumuli" ..... Dr. H. C. MARCH

The following objects were Exhibited :—

(1) Flints from the Isle of Man (Peel).....Dr. MARCH

(2) Old Papers and Documents lent by Mr. THOMAS KING

Mar. 13th.—"Our Forefathers" .....Dr. T. HUNT

April 3rd.—"Coal Smoke" ..... Mr. T. STENHOUSE, F.C.S., F.I.C.

EXCURSIONS, 1891.

No. I. May 30th.—Ribchester ..... Lieut.-Col. FISHWICK, F.S.A.

No. II. June 13th.—"A Boulder Ramble"—Greenbooth to Fern Isle Wood .....Mr. JAMES HORSFALL

No. III. June 27th.—Heysham and Lancaster ..... The PRESIDENT

No. IV. July 11th.—Astley Hall .....Mr. J. E. SCHUNCK

No. V. Sept. 5th.—Melandra Castle ..... Dr. THOMAS HUNT

ROCHDALE LITERARY AND SCIENTIFIC SOCIETY.

BALANCE SHEET FOR 1891.

DR.	£	s.	d.
To Balance from previous year	27	1	3
,, Subscriptions	64	3	0
,, Sale of Transactions	2	19	5
,, ,, Conversazione Tickets	1	15	6
,, Bank Interest	0	8	5
	£96	7	7

CR.	£	s.	d.
By Hire of Rooms	2	17	6
,, Printing, Stationery, Advertising and Postage	18	1	9
,, Conversazione Expenses	26	13	10
,, Excursion Expenses	1	12	7
,, Transactions, Vol. II.	0	10	6
,, Sundries	1	4	3
,, Balance in Bank	45	7	2
	£96	7	7

EDWARD LYON TAYLOR, Hon. Treasurer.

Examined and found correct,

HENRY BOOTH, Auditor.

December 9th, 1891.

BOOKS AND PAMPHLETS

PRESENTED TO THE SOCIETY IN 1891.

No.
46. "Report of the Delegate of the Manchester Geological Society to the British Association," by W. Watts, F.G.S.

47. "The International Journal of Microscopy and Natural Science," Vol. I.

48. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. IV., No. 1 (Fourth Series, 1890-1).

49. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. IV., No. 2 (Fourth Series, 1890-1).

50. "Journal of the Oldham Microscopical Society and Field Club for 1890."

51. "Report of the Marlborough College Natural History Society for 1890."

52. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. IV., No. 3 (Fourth Series).

53. "Report of the Manchester Museum, Owens College."

54. "Transactions of the Liverpool Geological Association," Vol. X., 1889-90.

55. "Report of the British Association for 1890"—Leeds Meeting.

56. "Transactions of the Manchester Microscopical Society for 1890."

57. "Transactions of the Manchester Geological Society," Vol. XXI., Parts I.-X.

58. "Transactions of the Yorkshire Naturalists' Union from 1877-1889," 15 Parts.

59. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. IV., No. 4 (Fourth Series).

60. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. IV., No. 5 (Fourth Series).

61. "British Association Handbook to Cardiff, 1891."

62. "Transactions of the Manchester Geological Society," Vol. XXI., Part XI.

LIST OF MEMBERS, 1891.

Honorary Member:

Dawkins, W. Boyd, M.A., F.G.S., The Owens College, Manchester..... 1882

Ordinary Members:

1	Aldridge, Rev. E. H., M.A., the Vicarage, Facit	1880
	Ashworth, Rev. George H., M.A., Whitburn, Sunderland	1880
	Ashworth, J. R., 20, King Street South	1883
	Baillie, Dr., Whitworth	1887
	Baillie, Mrs., Whitworth	1887
	Baldwin, Anthony, Castleton Villas	1882
	Bamford, J. W., Cronkeyshaw	1878
	Bardsley, John J., Bridgefield	1879
	Barraclough, Mrs., 5, Mere Street	1884
10	Beaumont, C. R., Tomes House	1884
	Berry, Rev. W., M.A., Smallbridge	1888
	Birch, Thomas, 34, Livsey Street	1887
	Blunden, G. H., Birch View, Broadley	1891
	Booth, Edward K., Castleton Villas	1886
	Booth, Mary, Castleton Villas	1888
	Booth, Henry, Central Chambers	1888
	Bradford, Rev. J. C., B.A., Balderstone Vicarage	1890
	Bramhall, James, William Street	1888
	Brearley, George, 15, Sussex Street	1887
20	Brierley, B. C., Connaughten, Oakenrod	1890
	Brierley, Rev. E., Vicarage, Whitworth	1880
	Bright, John A., M.P., One Ash	1878
	Bright, Mrs. Frank, Beutfield	1885
	Broadbent, Miss, Egerton Terrace	1890
	Broadbent, R. J., Egerton Terrace	1890
	Buckmaster, Mrs. C. A., 16, Heathfield Road, Mill Hill Park, London, W.	1885
	Calman, Mrs., Balgay Terrace	1882
	Calvert, J. M., Fairfield, King's Road	1889
	Calvert, J. W., King's Road	1885
30	Carrington, Miss, Suffolk Street	1882
	Chadwick, Dr., Butterworth Hall	1886
	Chadwick, Miss, Newhey	1887
	Chadwick, Lucy, Newhey	1888
	Cheetham, W. A., Park Hill, Regent Street	1885
	Clegg, Emily, Walmsley House	1891
	Clegg, James, 10, Milnrow Road	1879
	Clegg, Miss, Laurel House	1890

	Clegg, Emily, Laurel House	1890
	Collier, Alice, Knowsley Villa, Heights Lane	1890
40	Collier, Lucy, Knowsley Villa, Heights Lane	1890
	Collier, James L., 59, Heights Lane	1890
	Collier, Mrs. J. L., 59, Heights Lane	1890
	Craven, George, Summerlease	1890
	Craven, Miss, Summerlease	1890
	Crawshaw, G. W., Drake Street	1891
	Crowther, A. H., Falinge Road	1879
	Davies, Rev. D. O., 151, Drake Street	1887
	Davies, Rev. Henry, All Saints, Hamer	1887
	Dawson, R. B., The School of Art	1889
50	Ducker, John, Wardle	1888
	Dunning, Wilson, 69, King's Road	1878
	Elliott, Dr. A. B., Clement Royds Street	1878
	Elliott, C., Como Terrace	1883
	Elliott, Mrs., C., Como Terrace	1883
	Fishwick, Caroline, The Heights	1880
	Fishwick, Jane, The Heights	1887
	Fishwick, Florence, The Heights	1889
	Fishwick, Lieut.-Col., F.S.A., The Heights	1878
	Fishwick, Miss, The Heights	1879
60	Fox, Mrs., 119, Manchester Road	1890
	Franklin, A. H., 17, Promenade	1879
	Glazier, Richard. Urmston	1882
	Greaves, Joseph E. E., 17, Sussex Street	1882
	Greaves, Joseph, 17, Sussex Street	1885
	Greenwood, Abraham, 103, Tweedale Street	1879
	Greenwood, Robinson, Roach House, South Street	1884
	Hadley, W. W., 23, South Street	1891
	Hamilton, Edith, Broom Hill	1885
	Handley, J. W., Yorkshire Street	1883
70	Hanson, George, Free Library	1878
	Hardy, T. J., *Times* Office, The Bank	1885
	Hartley, J. R., Roche Mount	1886
	Hartley, W. H., 156, Edmund Street, W.	1890
	Haslewood, Rev. W., B.A., 54, Milnrow Road	1889
	Hayle, T. H., M.B., Drake Street	1880
	Hayle, Caroline, Drake Street	1890
	Healey, E., Townhead	1886
	Heap, Annie W., Beech House	1891
	Heap, Mary E., Beech House	1891
80	Heape, Mrs. Ben., Crossfield	1886
	Heape, Charles, Glebe House	1878
	Heape, J. R., J.P., Glebe House	1879
	Heape, Mrs. J. R., Glebe House	1879
	Heape, R. T., Half Acre	1890
	Heywood, Joseph, Sunny Bank	1883
	Hodgson, Mrs., Wellington Terrace	1889
	Hollowell, Rev. J. Hirst, 37, Broadfield	1890
	Hollowell, Mrs., 37, Broadfield	1890
	Hollowell, Miss, 37, Broadfield	1890
90	Holt, Thomas, 76, Molesworth Street	1887

	Holt, W., 20, Hanover Street	1890
	Hopkinson, Charles, 54, Prince Street	1889
	Horsfall, James, Healey Nursery	1878
	Horsfall, Jesse, Todmorden	1886
	Hoyle, Clara, Wardleworth Cottage	1891
	Hunt, Thomas, M.D., M.S., Heywood	1886
	Hunt, Mrs., Heywood	1889
	Hurst, Richard, J.P., Springhill	1890
	Jackson, George, Tweedale Street	1878
100	Jardine, James, M.B., Hornby House, Heywood	1888
	Jones, James E., Sparth House	1879
	Kay, Alice, Harefield Hall	1879
	Kemp, George, B.A., Beechwood	1888
	King, Miss Gertrude, Mereland Terrace	1891
	Law, Alfred J., Bent House, Littleborough	1890
	Lawton, T., Greave Mount	1884
	Leach, John, Bruce Terrace	1884
	Leech, Miss A., Moss Cottage	1889
	Leach, Robert A., Rochdale Union Office, Yorkshire Street	1879
110	Lee, A. E., Moore Edge, Bamford	1889
	Lee, James, Fenton Street	1888
	Linley, Clement A., 10A, South Street	1883
	Littlewood, Mrs. J. S., Healey Hall	1888
	Lord, James, Vavasour Street	1891
	Lord, S. T., Laurel Street	1887
	Lord, T. B., junr., Townhead	1887
	Lowry, Rev. J. Austin, 27, Charles Lane, Milnrow	1890
	Lye, Frederick, Fieldhouse	1888
	Mack, T., 94, Mitchell Street	1887
120	McKenzie, T. H., Tweedale Street	1886
	McKenzie, Mrs., Tweedale Street	1886
	March, H. C., M.D., West Street	1878
	March, Mrs. H. C., West Street	1879
	March, Owen, Lord Street	1880
	Matley, Levi, 60, Fenton Street	1885
	Mellor, John W., Spring Bank	1879
	Mellor, Zach., Promenade	1879
	Mills, Dr. Wilton, Albert Street, Milnrow	1889
	Molesworth, Alexander, Shawclough	1878
130	Morris, Mrs., Castlemere Terrace	1888
	Nickalls, Mrs., Cardiff	1888
	Oddy, Robert W., A.I.C., Waterhouse, Toad Lane	1883
	Ogden, James, Kilnerdeyne	1878
	Oldham, J. S., 26, York Street	1890
	Ormerod, John, Fern Bank, Castleton	1886
	Ormerod, Miss, Fern Bank, Castleton	1885
	Osborn, E. H., M.A., 25, Hare Street	1887
	Padwick, F. G., Hall Bank	1891
	Parker, William, Facit	1890
140	Pearson, Herbert, Milnrow	1891
	Pearson, T. A. Milnrow	1878

	Pennington, W. H., Fieldhouse	1878
	Petrie, Gertrude, Grove House	1885
	Petrie, Miss, Grove House	1879
	Petrie, Fred W., West Bank, Shawclough	1880
	Petrie, William S., Falinge Road	1879
	Petrie, Mrs. W. S., Falinge Road	1888
	Petrie, John E., Castlemere	1888
	Petrie, Mary, Castlemere	1890
150	Place, Eliza, Molesworth Street	1879
	Platt, S. S., A.M.I.C.E., 14, King Street South	1878
	Platt, Mrs. S. S., 14, King Street South	1883
	Porritt, Arthur E., Plumpton, Heywood	1889
	Porritt, B. M., Bamford	1890
	Porritt, L. A., Falinge Road	1886
	Radcliffe, Herbert, J.P., Balderstone Hall	1888
	Renshaw, Charles, 36, King Street South	1886
	Renshaw, Isaac, L.D.S., 87, Drake Street	1879
	Robinson, Richard, J.P., Belfield Mill	1878
160	Rothwell, Edmund, Bury Road	1886
	Scobie, Rev. Andrew, M.A., B.D., 180, Drake Street	1891
	Schofield, Edwin, 12, Manchester Road	1882
	Schofield, James, Croft Head, Littleborough	1883
	Schofield, Mrs. James, Croft Head, Littleborough	1883
	Schofield, John, Greenroyd	1886
	Schofield, Thomas, J.P., Thornbury	1879
	Schofield, T. W., Harefield	1882
	Schofield, R. W., Harefield	1888
	Schofield, Miss, Harefield	1890
170	Schofield, Miss E., Harefield	1890
	Scott, Hugh, Broadfield	1882
	Scott, Walter, Highfield	1882
	Scott, Mrs. W., Highfield	1886
	Schunck, J. E., Wicken Hall	1882
	Sellers, Dr. R. Burdett, Townhead House	1883
	Shaw, Arthur W., Southfield	1879
	Shaw, Reginald W., King's Road	1879
	Shaw, William W., Castleton Villas	1879
	Shawcross, Harold, Rose Hill	1879
180	Shawcross, Leonard, Clover Cottage	1883
	Shore, Samuel, New Barn Lane	1878
	Simpson, S. T., The Ashlands, Castleton	1883
	Slack, Robert, Falinge Fold	1878
	Smithson, James, Facit	1879
	Smithson, Spencer, Facit	1880
	Southcomb, Miss Florence, Broomhill	1891
	Southcomb, Miss May, Broomhill	1891
	Sparkes, J. J., White Knights, East Road, Reading	1879
	Spawforth, Thomas H., Standring House, Bagslate	1879
190	Spedding, Rev. T. P., 97, Mitchell Street	1888
	Standring, Miss, Dunsterville	1884
	Standring, Walter, Oldham Road	1884
	Standring, Mrs., W., Oldham Road	1879
	Stenhouse, Thomas, F.C.S., F.I.C., 8, West Street	1883
	Stevens, Allan, The Butts	1889
	Stevens, Mrs., The Butts	1889
	Stewart, N., M.D., Bank House, Bacup	1888
	Stopford, Rev. J. B., M.A., Dearnley	1888

	Stott, John, Parkhill, Regent Street	1880
200	Stuttard, Rev. J., Wharncliffe Place, Manchester Road	1887
	Sutcliffe, James, King's Road	1879
	Sutcliffe, W. H., Shore, Littleborough	1886
	Sykes, W. A., Morton, Heyside, near Oldham	1891
	Taylor, Edward Lyon, Falinge Road	1878
	Taylor, Mrs., E. L., Falinge Road	1882
	Tempest, Miss, St. Alban's Street	1891
	Tonge, John, 18, Henry Street	1884
	Turner, John, Larkhill	1886
	Turner, Samuel, Falinge Road	1890
210	Turner, Mrs. Samuel, Falinge Road	1890
	Veitch, Rev. R., M.A., Providence Chapel	1885
	Waldie, Rev. F. E., M.A., Ashworth Hall	1886
	Walker, George, Fairlight Villa, Spotland Road	1889
	Walker, Dr., Daisy Bank, Spotland Road	1889
	Watson, Emily, Horse Carrs	1882
	Watson, Miss, Horse Carrs	1882
	Watson, W. D., Horse Carrs	1886
	Watson, Dr. R., Yorkshire Street	1879
	Watson, Richard, Thrum Hall	1878
220	Watson, Thomas, Carr Hill	1878
	Watts, William, F.G.S., Picthorn	1880
	Webb, W. H., Moss Street	1891
	Welsh, A., M.D., Whitworth	1879
	Whitworth, J. B., Heathfield, Littleborough	1884
	Whitworth, Miss, Westville, Facit	1887
	Whitworth, W. E., Westville, Facit	1887
	Whitworth, Herbert, Westville, Facit	1889
	Wild, John, 1, Dover Street	1878
	Wiles, William, Lynton House, Mere Street	1880
230	Wiles, Mrs. W., Lynton House, Mere Street	1891
	Wilson, W., 24, East Street	1883
	Wilson, Ven. Archdn., M.A., F.G.S., F.R.A.S., The Vicarage.	1890
	Wood, J. Tertius, F.G.S., Bent Meadows	1886
	Wright, Rev. F. P., M.A., Milnrow	1887
	Wright, Dr. J. F., The Infirmary	1891
	Wrigley, Robert, Tweedale Street	1891
	Wrigley, Mrs. R., Tweedale Street	1891
	Wyatt-Wareham, Rev. T., M.A., Newhey	1890
	Wylie, J. H., M.A., Heybrook	1881
240	Wylie, Mrs. J. H., Heybrook	1881
	Yates, John, Castleton	1888
	Yewdall, Mrs., South Dene	1883
	Yewdall, Mrs. C., Manchester Road	1888

JAMES CLEGG, PRINTER, MILNROW ROAD, ROCHDALE.

REPORT

READ AT THE

ANNUAL MEETING, DECEMBER 20TH, 1892.

FOLLOWING the precedents of former years, and pursuant to the Rules, your Council present their Report of the affairs of the Society, and a Balance Sheet of the Accounts for the year ending December 31st, 1892.

The Roll of Membership exhibits a considerable increase upon previous figures. There were 244 members at the time of the last Report, 10 names have since been removed by resignation, and 24 added by election, the net gain for the year being 14. The total membership at the present date is, therefore, 258.

From the Balance Sheet submitted by the Hon. Treasurer, and duly audited, it will be seen that the Society's Income from the usual sources has been £69 12s. 5d., and the Expenditure, £60 7s. 10d., the principal item of increase under this head being that of Rent. The balance in the Bank is £54 11s. 9d., an increase upon last year's of £9 4s. 7d., and there is about £5 of subscriptions yet to be received. The average cost per member has been 4s. 8d. approximately.

At the Election of Officers which took place at the last Annual Meeting, December 15th, 1891, the Ven. Archdeacon Wilson, M.A., F.R.S., was placed on the list of Vice-Presidents, and Mr. C. Heape resumed his seat as a Councillor. The other officers, with one exception, were re-elected.

During the year nine Ordinary Meetings and the Annual Meeting have been held in the months of January, February, March, April, November, and December. At the Annual Meeting, and on two other evenings, Short Communications were read, the remaining meetings being occupied with papers by members, and with a special lecture by Mr. O. W. Jeffs. A list of papers and excursions is annexed, most of which will be found printed at length in the third volume of the Transactions now in the press. The Conversazione which inaugurated the present Winter Session, was held as before in the Great Room of the Town Hall, and there was again a crowded attendance.

Of the five Field Meetings that were arranged to take place in the months of May, June, July, and September, one was postponed owing to the dislocation of affairs consequent upon the Dissolution of Parliament and the General Election. The four that were held were well attended in spite of unfortunate weather in more than one instance.

Your Council would remind members of their indebtedness to those who have actively promoted the aims of the Society by reading papers, leading excursions, and by the loan of objects of interest, as well as to those who have less conspicuously, but not less zealously, rendered services. A special acknowledgment is due to O. W. Jeffs, Esq. (of Liverpool), for his lecture in November last on "Photographic Records of the Rocks."

In addition to the Societies named in last year's Report with which this Society exchanges Transactions, the Manchester Field Naturalists' and Archæologists' Society, and the Hull Literary and Philosophical Society have been placed on the exchange list. About 25 books and papers have been received during the current year for which acknowledgments have been tendered. The library of this literature, which is thus accumulating, it is intended shall be lodged where it may be conveniently consulted.

At the British Association Meeting, which was held at Edinburgh in August, Mr. W. Watts, F.G.S., kindly undertook the duties of Delegate, and submitted a Report of the proceedings thereat to the Meeting of November 8th last. The Society is asked to interest itself, among other questions, in the work of Photography in relation to Geology and Meteorology in the Ethnographical Survey of Great Britain which is now being organised, and in the Enquiry into the Physical Condition of Children in Board Schools: also to continue the recording of Erratic Blocks in this locality. For these purposes one or two sub-committees have already been formed, and offers of assistance by those who are interested in such questions so far as they relate to this district would be very gladly received.

It has already been intimated that your Council resolved to publish a third volume of Transactions, and that they expected to have presented it at the date of the Conversazione in October last. An unavoidable delay, however, occurred which prevented this expectation being realised, but they are now able to announce that all obstacles to an early issue of copies are removed, so that it will be possible to place the volume in your hands, together with this Report, at the beginning of the ensuing year.

This volume, which will be presented for the first time gratuitously to each member, places the papers read before the Meetings within the reach of all associates. But the stimulus to thought and enquiry by discussion and debate is not the less needed, and your Council emphasize this means of enlarging still further the influence of the Society so that it may the more effectively advance the interests and promote the pursuits of Literature and Science.

SYLLABUS, 1891-2.

1891.

THURSDAY.

Oct. 12th.—Opening Conversazione.

FRIDAYS.

Nov. 13th.—"Leaves"..... ..... Mr. T. S. SMITHSON

Nov. 27th.—"Some Principles of Hydraulics"—illustrated ..... Mr. W. WATTS, F.G.S.

Dec. 11th.—Annual Meeting. "Examples of the Pagan-Christian Overlap in the North" .....The PRESIDENT

1892.

Jan. 8th.—"Our Local Problem of Poverty" ... Rev. R. VEITCH, M.A.

Jan. 22nd.—"Rochdale Surnames".....Lieut-Col. FISHWICH, F.S.A.

Feb. 12th.—Short Communications.

(1) "Remarks on Old Coins—English, Scotch, and Irish"... Dr. HUNT

(2) "Some Recent Results of the Investigation into Local Erratic Blocks." ..... Mr. S. S. PLATT

(3) "Sir Walter Scott's Novels" ..... Mr. J. W. BAMFORD

(4) "Extracts from some Correspondence on Indian Flints" Dr. MARCH

Feb. 26th.—"Aristophanes" ..... Mr. GEORGE KEMP, B.A.

Mar. 11th.—"Translations from Stolpe's Development of Savage Ornament ..... Mrs. H. C. MARCH

(Mr. Chas. Heape illustrated it from his Collection.)

Mar. 25th.—"Discoveries and Problems of Modern Astronomy"—with illustrations .....Ven. Archdeacon WILSON, M.A.

April 8th.—Short Communications.

(1) "Intelligent Atoms".....Mr. JAMES HORSFALL

(2) "Magic Knots" ..... Dr. MARCH

(3) "Temperature of the Rochdale Reservoirs" ..... Mr. J. R. ASHWORTH

EXCURSIONS, 1892.

No. I. May 23rd.—Rivington Pike and the Manchester Water Works, Mr. ED. LYON TAYLOR

No. II. June 18th.—"Pecket Well" ..... Mr. W. H. SUTCLIFFE

No. III. July 2nd.—Pendle Hill.....Mr. JAMES HORSFALL

(Postponed.)

No. IV. July 23rd.—Chester .....Dr. HUNT

No. V. Sept. 3rd.—Whiteley Dean ..... Mr. S. S. PLATT, C.E.

ROCHDALE LITERARY AND SCIENTIFIC SOCIETY.

BALANCE SHEET FOR 1892.

DR.	£	s.	d.	CR.	£	s.	d.
To Balance from last Session	45	7	2	By Hire of Rooms	5	7	0
,, Subscriptions	67	7	0	,, Printing, Stationery, Advertising, and Postage	22	7	0
,, Sale of Transactions	0	8	6	,, Conversazione Expenses	26	19	8
,, ,, Conversazione Tickets	1	4	0	,, Excursion Expenses	0	9	8
,, Bank Interest	0	12	11	,, Diagrams for Transactions, Vol. III.	1	17	6
				,, Lantern and Lecturers' Expenses	2	1	0
				,, Sundries	1	6	0
				,, Balance in Bank	54	11	9
	£114	19	7		£114	19	7

EDWARD LYON TAYLOR, Hon. Treasurer.

Examined and found correct,

HENRY BOOTH,

58A, Yorkshire Street,

19th December, 1892.

BOOKS AND PAMPHLETS

PRESENTED TO THE SOCIETY IN 1892.

No.
63. "Transactions of the Manchester Geological Society," Vol. XXI., Part XII.
64. "Manchester Field Naturalists' Society, Town Gardening Section, Preliminary Report on the Atmosphere of Manchester."
65. "Transactions of the Yorkshire Naturalists' Union, Part XVI. for 1890."
66. "Transactions of the Manchester Geological Society," Vol. XXI., Part XIII.
67. "Handbook to the Manchester Museum, Owens College," by W. E. Hoyle.
68. "British Association Report, Cardiff Meeting, 1891."
69. "Natural Science," Vol. I., No. II.
70. "Report of the Marlborough College Natural History Society for 1891."
71. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. V., No. 1. (Fourth Series).
72. "Transactions of the Manchester Geological Society," Vol. XXI., Parts XIV.-XV.
73. "Transactions of the Manchester Geological Society," Vol. XXI., Part XVI.
74. "Transactions of the Manchester Geological Society," Vol. XXI., Part XVII.
75. "Thermometrical Observations of Air and Water at Piethorn and Denshaw," by W. Watts, F.G.S.
76. "Report and Transactions of the Hull Literary and Philosophical Society, 1891-92."
77. "Transactions and Annual Report of the Manchester Microscopical Society for 1891."
78. "Transactions of the Manchester Geological Society," Vol. XXI., Part XVIII.
79. "Transactions of the Manchester Geological Society," Vol. XXI., Part XIX.
80. "Transactions of the Manchester Geological Society," Vol. XXI., Part XX.
81. "Report and Proceedings of Manchester Field Naturalists' and Archæologists' Society for 1891."
82. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society," Vol. V., No. 2 (Fourth Series).
83. "The Pagan-Christian Overlap in the North," by H. C. March, M.D.
84. "Transactions of the Manchester Geological Society," Vol. XXII., Part I.
85. "Transactions of the Yorkshire Naturalists' Union, Part XVI. for 1891."
86. "Transactions of the Manchester Geological Society," Vol. XXII., Part II.

BRITISH ASSOCIATION.

The Secretary of the Corresponding Societies' Committee invites the assistance of Members of the Society in the Scientific Work of the various Committees appointed at the Newcastle Meeting.

A List of Committees, and Report of the Corresponding Societies' Committee, may be obtained on application to J. R. Ashworth, Hon. Secretary, 20, King Street South, Rochdale.

LIST OF MEMBERS, 1893.

Honorary Member:

Dawkins, W. Boyd, M.A., F.G.S., The Owens College, Manchester..... 1882

Ordinary Members:

1 Aldridge, Rev. E. H., M.A., the Vicarage, Facit 1880
Ashworth, Rev. George H., M.A., Whitburn, Sunderland 1880
Ashworth, J. R., 20, King Street South 1883

Baillie, Dr., Whitworth..... 1887
Baillie, Mrs., Whitworth 1887
Baldwin, Anthony, Castleton Villas 1882
Bamford, J. W., Cronkeyshaw 1878
Barraclough, Amos, 5, Mere Street..... 1892
Barraclough, Mrs., 5, Mere Street 1884
10 Beaumont, C. R., Tomes House 1884
Berry, Rev. W. B., M.A., Smallbridge..... 1888
Birch, Thomas, 34, Livsey Street 1887
Blunden, G. H., Birch View, Broadley..... 1891
Booth, Edward K., Castleton Villas 1886
Booth, Mary, Castleton Villas..... 1888
Booth, Henry, 58A, Yorkshire Street..... 1888
Boycott, Miss F. G., 36, William Street 1892
Bradford, Rev. J. C., B.A., Balderstone Vicarage 1890
Bramhall, James, William Street..... 1888
20 Brearley, George, 15, Sussex Street 1887
Brierley, B. C., Connaughton, Oakenrod 1890
Brierley, Rev. E., Vicarage, Whitworth 1880
Bright, John A., M.P., One Ash..... 1878
Bright, Mrs. Frank, Bentfield 1885
Broadbent, Miss, Egerton Terrace 1890
Broadbent, R. J., Egerton Terrace..... 1890
Buckmaster, Mrs. C. A., 16, Heathfield Road, Mill Hill Park, London, W.... 1885
Calman, Mrs., Balgay Terrace 1882
Calvert, J. M., Fairfield, King's Road 1882
30 Calvert, J. W., King's Road..... 1885
Calvert, Mrs., King's Road 1892
Calvert, Miss F. G., King's Road 1892
Carrington, Miss, Suffolk Street 1882
Chadwick, Dr., Butterworth Hall 1886
Chadwick, Miss, Newhey 1887
Chadwick, Lucy, Newhey..... 1888
Chadwick, H. M., Albert Terrace, Drake Street..... 1892
Cheetham, W. A., Park Hill, Regent Street..... 1885
Clegg, Emily, Walmsley House 1891
40 Clegg, Miss F., Walmsley House..... 1892
Clegg, James, 10, Milnrow Road..... 1879
Clegg, Miss, Laurel House 1890
Clegg, Emily, Laurel House 1890

	Collier, Alice, Knowsley Villa, Heights Lane	1890
	Collier, Lucy, Knowsley Villa, Heights Lane	1890
	Collier, James L., 59, Heights Lane	1890
	Collier, Mrs. J. L., 59, Heights Lane	1890
	Craven, George, Summerlease	1890
	Craven, Miss, Summerlease	1890
50	Crawshaw, G. W., Drake Street	1891
	Crowther, A. H., Falinge Road	1879
	Davies, Rev. D. O., 151, Drake Street	1887
	Davies, Rev. Henry, All Saints', Hamer	1887
	Dawson, R. B., The School of Art	1889
	Ducker, John, Wardle	1888
	Duckworth, James (Mayor), Castlefield	1892
	Dunning, Wilson, 69, King's Road	1878
	Edmonds, Rev. H., A.K.C., St. Alban's Vicarage	1892
	Elliott, Dr. A. B., Clement Royds Street	1878
60	Elliott, C., Como Terrace	1883
	Elliott, Mrs. C., Como Terrace	1883
	Fairham, Miss, Tweedale Street	1892
	Fishwick, Lieut.-Col., F.S.A., The Heights	1878
	Fishwick, Miss, The Heights	1879
	Fishwick, Jane, The Heights	1887
	Fishwick, Florence, The Heights	1889
	Franklin, A. H., 17, Promenade	1879
	Glazier, Richard, Urmston	1882
	Greaves, Joseph E. E., 17, Sussex Street	1882
70	Greaves, Joseph, 17, Sussex Street	1885
	Greenwood, Abraham, 103, Tweedale Street	1879
	Greenwood, Robinson, Roach House, South Street	1884
	Hadley, W. W., South Street	1891
	Halstead, Rev. R., 54, Milnrow Road	1892
	Hamilton, Edith, Broom Hill	1885
	Handley, J. W., Yorkshire Street	1883
	Handley, J., The Birches, Whitworth	1892
	Handley, Miss F., The Birches, Whitworth	1892
	Hanson, George, Free Library	1878
80	Hardy, T. J., *Times* Office, The Bank	1885
	Hartley, J. R., Roche Mount	1885
	Hartley, W. H., 156, Edmund Street, W.	1890
	Haslewood, Rev. W., B.A., 54, Milnrow Road	1889
	Hayle, T. H., M.B., Drake Street	1880
	Hayle, Caroline, Drake Street	1890
	Healey, E., Townhead	1886
	Heap, Annie W., Eversleigh	1891
	Heap, Mary E., Eversleigh	1891
	Heape, Mrs. Ben, Crossfield	1886
90	Heape, Charles, Glebe House	1878
	Heape, J. R., J.P., Glebe House	1879
	Heape, Mrs. J. R., Glebe House	1879
	Heape, R. T., Church Stile	1890
	Heywood, Joseph, Sunny Bank	1883
	Hollowell, Rev. J. Hirst, 37, Broadfield	1890
	Hollowell, Mrs., 37, Broadfield	1890

	Hollowell, Miss, 37, Broadfield	1890
	Holt, Thomas, 76, Molesworth Street (deceased)	1887
	Hopkinson, Charles, 54, Prince Street	1889
100	Horsfall, James, Healey Nursery	1878
	Horsfall, Jesse, Todmorden	1886
	Hoyle, Clara, Wardleworth Cottage	1891
	Hunt, Thomas, M.D., M.S., Heywood	1886
	Hunt, Mrs., Heywood	1889
	Hurst, Richard, J.P., Springhill	1890
	Jackson, George, Tweedale Street	1878
	Jardine, James, M.B., Hornby House, Heywood	1888
	Jones, James E., Sparth House	1879
	Kay, Alice, Harefield Hall	1879
110	Kemp, George, B.A., Beechwood	1888
	Kershaw, William, King's Road	1892
	King, Miss Gertrude, Mereland Terrace	1891
	Law, Alfred J., Bent House, Littleborough	1890
	Lawson, J., junr., 4, Halifax Road	1892
	Lawton, T., Greave Mount	1884
	Leach, John, Bruce Terrace	1884
	Leech, Miss A., Moss Cottage	1889
	Leach, Robert A., Rochdale Union Office, Yorkshire Street	1879
	Lee, A. E., Moore Edge, Bamford	1889
120	Lee, James, Franchise Street	1888
	Linley, Clement A., 10A, South Street	1883
	Littlewood, Mrs. J. S., Half Acre	1888
	Looker, F., M.A., Drake Street	1892
	Looker, Mrs., Drake Street	1892
	Lord, James, Vavasour Street	1891
	Lord, S. T., Laurel Street	1887
	Lord, T. B., junr., Townhead	1887
	Lowry, Rev. J. Austin, 27, Charles Lane, Milnrow	1890
	Lye, Frederick, Fieldhouse	1888
130	Mack, T., 94, Mitchell Street	1887
	Mc.Kenzie, T. H., Tweedale Street	1886
	Mc.Kenzie, Mrs., Tweedale Street	1886
	Mc.Naught, Miss, Moss Cottage	1892
	March, H.C., M.D., F.S.A., West Street	1878
	March, Mrs. H. C., West Street	1879
	March, Owen, Lord Street	1880
	Marshall, William, F.C.S., 15, West Street	1892
	Matley, Levi, 60, Fenton Street	1885
	Mellor, John W., Spring Bank	1879
140	Mellor, Mrs., Spring Bank	1892
	Mellor, Zach., Promenade	1879
	Mills, Dr. Wilton, Albert Street, Milnrow	1889
	Molesworth, Alexander, Shawclough	1878
	Morris, Mrs., Castlemere Terrace	1888
	Oddy, Robert W., A.I.C., Waterhouse, Toad Lane	1883
	Ogden, James, Kilnerdeyne	1878
	Ormerod, John, Fern Bank, Castleton	1881
	Ormerod, Miss, Fern Bank, Castleton	1885
	Osborn, E. H., M.A., Manchester	1887

150	Padwick, F. G., M.A., Downham House	1891
	Parker, William, Facit	1890
	Pearson, Herbert, Milnrow	1891
	Pearson, T. A., Milnrow	1878
	Pennington, W. H., Fieldhouse	1878
	Petrie, Gertrude, Grove House	1885
	Petrie, Miss, Stone Hill	1879
	Petrie, Fred W., West Bank, Shawclough	1880
	Petrie, William S., Falinge Road	1879
	Petrie, Mrs. W. S., Falinge Road	1888
160	Petrie, John E., Castlemere	1888
	Petrie, Mary, Castlemere	1890
	Pinder, T., Yorkshire Street	1892
	Place, Eliza, Molesworth Street	1879
	Platt, S. S., A.M.I.C.E., 14, King Street South	1878
	Platt, Mrs. S. S., 14, King Street South	1883
	Porritt, B. M., Bamford	1890
	Porritt, L. A., 129, Tweedale Street	1886
	Porritt, Mrs., 129, Tweedale Street	1892
	Radcliffe, Herbert, J.P., Balderstone Hall	1888
170	Renshaw, Charles, 36, King Street South	1886
	Renshaw, Isaac, L.D.S., 87, Drake Street	1879
	Robinson, Richard, J.P., Belfield Mill	1878
	Robinson, Miss, Baillie Street	1892
	Rothwell, Edmund, Bury Road	1886
	Scobie, Rev. Andrew, M.A., B.D., 180, Drake Street	1891
	Schofield, Edwin, 12, Manchester Road	1882
	Schofield, James, Croft Head, Littleborough	1883
	Schofield, Mrs. James, Croft Head, Littleborough	1883
	Schofield, John, Greenroyd	1886
180	Schofield, T. W., Harefield	1882
	Schofield, R. W., Harefield	1888
	Schofield, Miss, Harefield	1890
	Schofield, Miss E., Harefield	1890
	Scott, Hugh, Broadfield (deceased)	1882
	Scott, Walter, Highfield	1882
	Scott, Mrs. W., Highfield	1886
	Schunck, J. E., Wicken Hall	1882
	Sellers, Dr. R. Burdett, Townhead House	1883
	Shaw, Arthur W., Southfield	1879
190	Shaw, Reginald W., Buersill Hall	1879
	Shaw, William W., Castleton Villas	1879
	Shawcross, Harold, Rose Hill	1879
	Shawcross, Leonard, Clover Cottage	1883
	Shore, Samuel, New Barn Lane	1878
	Simpson, S. T., The Ashlands, Castleton	1883
	Slack, Robert, Falinge Fold	1878
	Smithson, James, Facit	1879
	Smithson, Spencer, Facit	1880
	Southcomb, Miss Florence, Broomhill	1891
200	Southcomb, Miss May, Broomhill	1891
	Sparkes, J. J., White Knights, East Road, Reading	1879
	Spawforth, Thomas H., Standring House, Bagslate	1879
	Spedding, Rev. T. P., 97, Mitchell Street	1888
	Standring, Miss, Dunsterville	1884
	Standring, Walter, Oldham Road	1884
	Standring, Mrs. W., Oldham Road (deceased)	1879

	Stenhouse, Thomas, F.C.S., F.I.C., 8, West Street	1883
	Stevens, Allan, The Butts	1889
	Stevens, Mrs., The Butts	1889
210	Stewart, N., M.D., Bank House, Bacup	1888
	Stopford, Rev. J. B., M.A., St. Alban's Street	1888
	Stott, John, Parkhill, Regent Street	1880
	Stuttard, Rev. J., Wharncliffe Place, Manchester Road	1887
	Sutcliffe, James, King's Road	1879
	Sutcliffe, W. H., Shore, Littleborough	1886
	Swift, W., Tweedale Street	1892
	Sykes, W. A. Morton, Heyside, near Oldham	1891
	Tarver, Miss C. M., 36, William Street	1892
	Taylor, Edward Lyon, Falinge Road	1878
220	Taylor, Mrs. E. L., Falinge Road	1882
	Tempest, Miss, St. Alban's Street	1891
	Tonge, John, 18, Henry Street	1884
	Turner, John, Larkhill	1886
	Turner, Samuel, Falinge Road	1890
	Turner, Mrs. Samuel, Falinge Road	1890
	Veitch, Rev. R., M.A., Providence Chapel	1885
	Waldie, Rev. F. E., M.A., Ashworth Hall	1886
	Walker, George, Fairlight Villa, Spotland Road	1889
	Walker, Dr., Daisy Bank, Spotland Road	1889
230	Watson, Emily, Horse Carrs	1882
	Watson, Miss, Horse Carrs	1882
	Watson, W. D., Horse Carrs	1886
	Watson, Dr. R., Yorkshire Street	1879
	Watson, Richard, Thrum Hall	1878
	Watson, Thomas, Carr Hill	1878
	Watts, William, F.G.S., Piethorn	1880
	Webb, W. H., Moss Street	1891
	Welsh, A., M.D., Whitworth	1879
	Whitworth, Miss, Westville, Facit	1887
240	Whitworth, W. E., Westville, Facit	1887
	Whitworth, Herbert, Westville, Facit	1889
	Wild, John, 1, Dover Street	1878
	Wiles, William, Lynton House, Mere Street	1880
	Wiles, Mrs. W., Lynton House, Mere Street	1891
	Wilson, W., 24, East Street	1883
	Wilson, Ven. Archdn., M.A., F.G.S., F.R.A.S., The Vicarage	1890
	Wood, J. Turtius, F.G.S., Bent Meadows	1886
	Wright, Rev. F. P., M.A., Milnrow	1887
	Wright, Dr. J. F., The Infirmary	1891
250	Wrigley, Robert, Tweedale Street	1891
	Wrigley, Mrs. R., Tweedale Street	1891
	Wyatt-Wareham, Rev. T., M.A., Newhey	1890
	Wylie, J. H., M.A., Heybrook	1881
	Wylie, Mrs. J. H., Heybrook	1881
	Yates, John, Castleton	1888
	Yewdall, Mrs., South Dene	1883
	Yewdall, Mrs., Manchester Road	1888

OFFICERS FOR 1893,

ELECTED AT ANNUAL MEETING, DECEMBER 20TH, 1892.

President:

LIEUT.-COL. FISHWICK, F.S.A.

Vice-Presidents:

H. C. MARCH, ESQ., M.D., F.S.A.
J. H. WYLIE, ESQ., M.A.
VEN. ARCHDEACON WILSON, M.A., F.R.A.S., F.G.S.
CHAS. HEAPE, ESQ.

Honorary Treasurer:

MR. EDWARD LYON TAYLOR.

Honorary Secretary:

MR. J. R. ASHWORTH, 20, KING STREET SOUTH.

Council:

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MR. JAMES HORSFALL.
ALD. J. R. HEAPE, J.P.
MR. S. S. PLATT, ASSOC. M. INST. C.E.
DR. HUNT.
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